

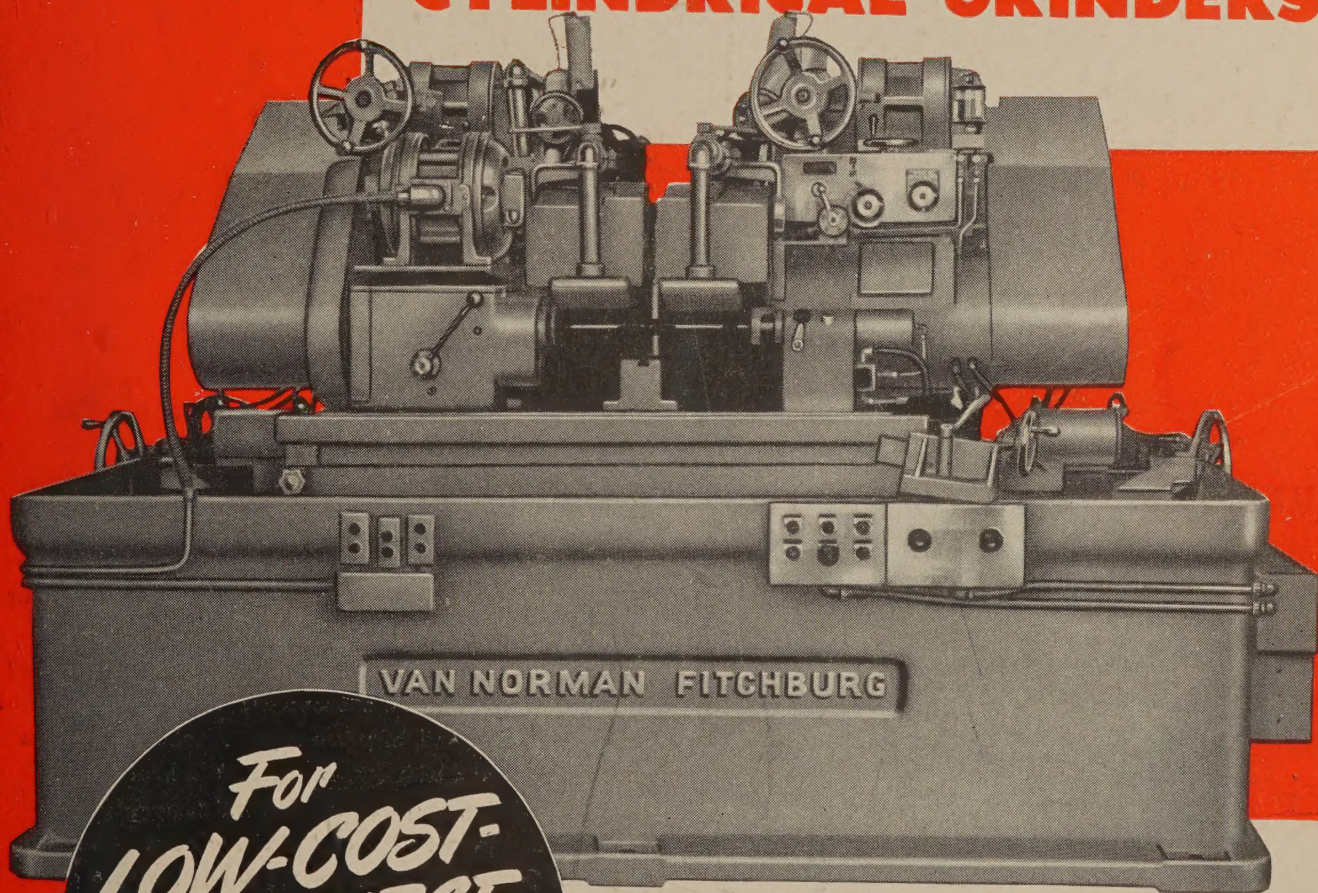
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w to Weld Clad Steels -p. 72
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co's Wax Room -p. 82
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The Illinois U Library

IRON AGE

JULY 22, 1948

VAN NORMAN FITCHBURG CYLINDRICAL GRINDERS



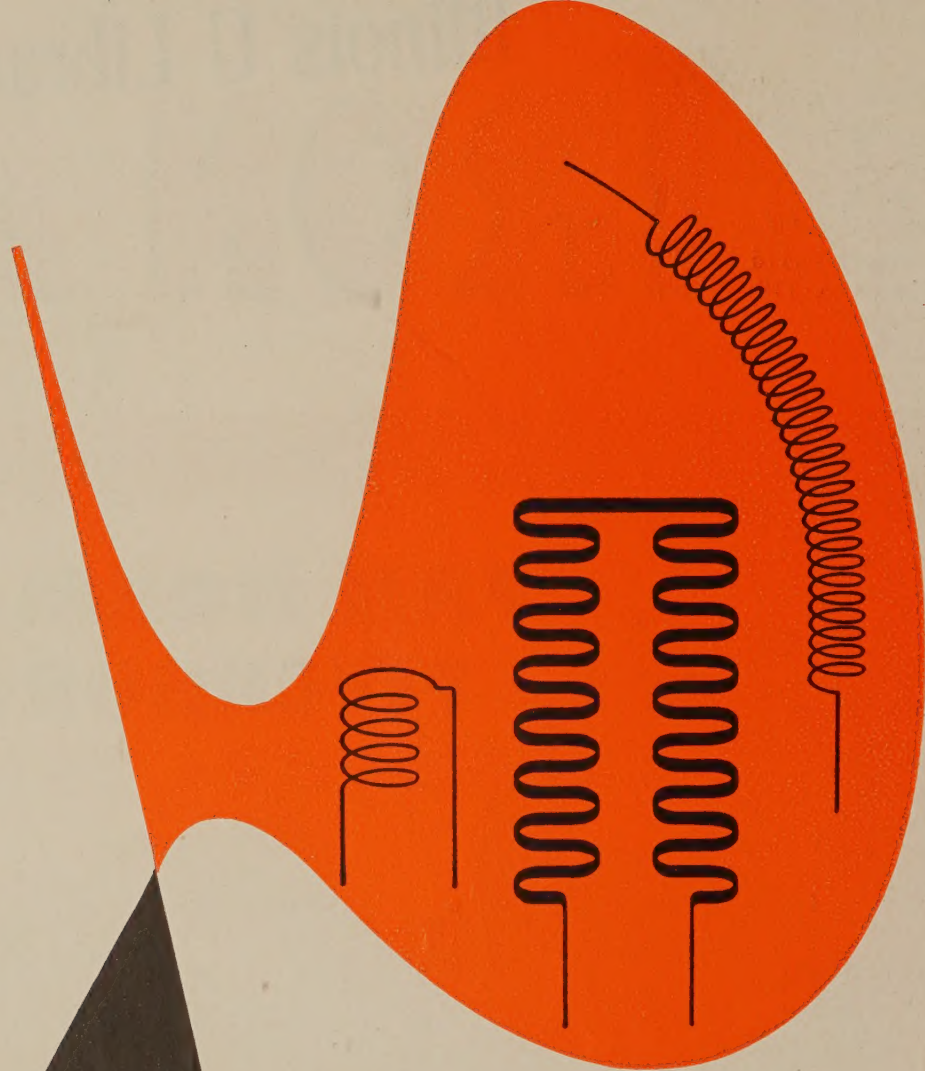
For
LOW-COST-
PER-PIECE
Automatic
Grinding

These versatile grinders give you automatic mass-production grinding that cuts tooling costs . . . increases output of finished parts.

The Van Norman Fitchburg line includes — Cylindrical Grinders, Angular Head Grinders, Spline and Gear Grinders, Consta-Contact Grinders and Bowgag Wheelheads.



VAN NORMAN COMPANY, SPRINGFIELD, MASSACHUSETTS



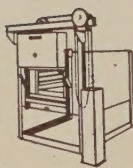
Hoskins electric furnaces equipped with durable **Chromel*** heating elements

*the original
nickel-chromium
heating element alloy

If good, dependable equipment is a "must" for your heat treat operations, best you get acquainted with Hoskins electric furnaces. They're sturdily constructed for long-life service . . . well insulated, too, for power economies and more comfortable working conditions. And, of prime importance, every Hoskins furnace is equipped with durable CHROMEL heating elements so designed as to provide maximum heating efficiency and permit quick and easy replacement when required. Catalog-59 describes the line . . . want a copy?



Type FR-206, 207,
208 Box Furnace



Type FR-251
Box Furnace



Type OR-104
Pot Furnace



Type FR
Pot Furnace

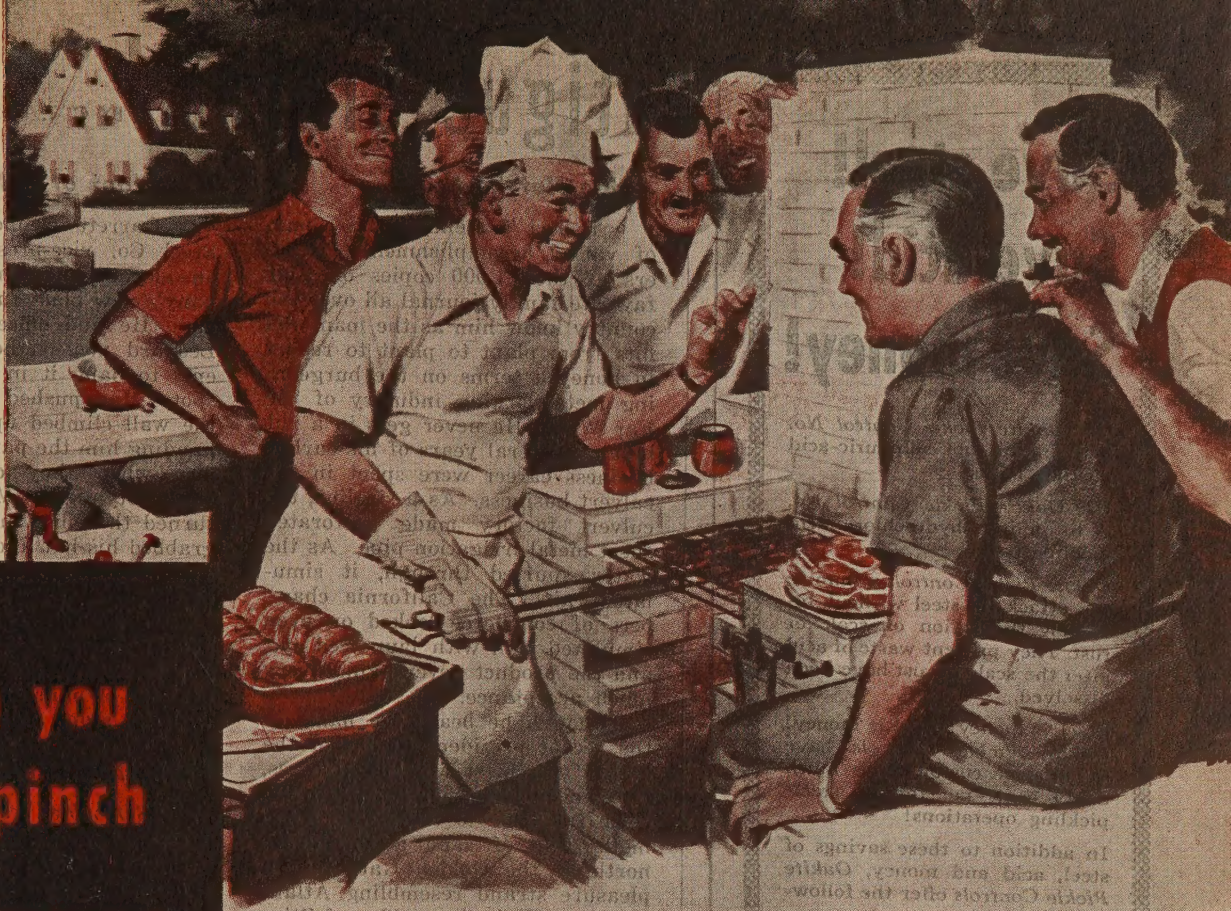
HOSKINS MANUFACTURING COMPANY

4445 LAWTON AVE. • DETROIT 8, MICHIGAN

Heating Element Alloys ★ Heat Resistant Alloys ★ Thermocouple Alloys ★ Spark Plug
Electrode Wire ★ Special Alloys of Nickel ★ Electric Heat Treating and Laboratory Furnaces



... then you
add a pinch
of *thyme*



There's an element of art in every business. The skills of the steel craft, shared and advanced through neighborly cooperation, have brought Barium customers the best possible steel and steel products.

Consider the advantages of Barium's coordinated facilities for melting, rolling, casting, forging, stamping, machining and fabricating

the steel used in your products. All of us in the Barium corporate neighborhood are ready to do our part in the often complex job of procuring and processing the steel you specify.

Get acquainted with the Barium subsidiary which can best advise you on your problems and supply your needs.

WE MELT, ROLL, CAST, FORGE, STAMP, MACHINE AND FABRICATE STEEL

ONE OF THE 16 BARIUM GOOD NEIGHBORS
THE GEOMETRIC STAMPING COMPANY
CLEVELAND, OHIO
Subsidiary of Barium Steel Corporation



Leading producer of medium and heavy metal stampings and assemblies. Geometric craftsmanship has served stamping users for over 30 years. Large modern plant has presses of 40 to 450 ton capacity, complete facilities in metal fabrication and welding . . . tool and die design and construction engineering and redesigning.

BARIUM STEEL CORPORATION

AMERICAN STEEL TRACTOR CORP., Canton, Ohio • CLYDE IRON WORKS, INC., Duluth, Minn. • CENTRAL IRON AND STEEL COMPANY, Harrisburg, Pa. • BARIUM STEEL & FORGE, INC., Canton, Ohio • BARIUM EQUIPMENT CORP., BARIUM STEEL EXPORT, INC. • BAYONNE BOLT CORP., Bayonne, N. J. • THE CUYAHOGA SPRING COMPANY, Cleveland, Ohio • THE GEOMETRIC STAMPING COMPANY, Cleveland, Ohio • PERMA-JACK CORP., Cleveland, Ohio • PORCELAIN STEELS CORP., Cleveland, Ohio • THE DETROIT STEEL CASTING COMPANY, Detroit, Mich. • SHEFFIELD IRON & STEEL CO., Sheffield, Ala. • KERMATH MANUFACTURING COMPANY, Detroit, Mich. • KERMATH (CANADA) LTD., Toronto, Ontario, Canada • REPUBLIC INDUSTRIES, INC., N. Y. • GLOBE FORGE, INC., Syracuse, N.Y. • ERIE BOLT & NUT COMPANY, Erie, Pa. • WILEY MANUFACTURING COMPANY, Mountville, Pa., and Port Deposit, Md.

Barium
STEEL CORPORATION
STEELWRIGHT TO THE NATION

EXECUTIVE OFFICES
25 BROAD ST., NEW YORK, N. Y.

Save steel! Save acid! Save money!

Use *Oakite Pickle Control No. 3* to inhibit hot sulphuric-acid pickling baths!

Use *Oakite Pickle Control No. 4* to inhibit hydrochloric-acid pickling baths!

Oakite Pickle Controls minimize the attack on steel without retarding the action on scale or rust. They prevent waste of acid after the scale or rust have been dissolved.

Steel is money! Acid is money! *Oakite Pickle Controls* have saved some customers as much as 19 cents per ton on steel-pickling operations!

In addition to these savings of steel, acid and money, *Oakite Pickle Controls* offer the following advantages:

1. Reduction of acid fuming — greater safety and comfort for workers.
2. Prevention of over-pickling and pitting — brighter surfaces, smoother bases for coats of tin or zinc.
3. Reduction of hydrogen embrittlement — shorter baking time for wire, greater protection against blistering of electroplated parts.
4. Cleaner work — better rinsing with less smut adherence.
5. Retardation of iron-sulphate formation—longer life for pickling solutions, less spent liquor.

Free Demonstration — The Oakite Technical Service Representative in your vicinity will be glad to demonstrate the efficiency of *Oakite Pickle Controls*. Ask him or write us for the new Oakite Special Service Report on "Improved Pickling and Neutralizing With Oakite Materials."

OAKITE PRODUCTS, INC.

30H Thames Street, NEW YORK-6, N. Y.

Technical Service Representatives Located in Principal Cities of United States and Canada

OAKITE

Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

Fatigue Cracks

BY C. T. POST

Judge Not Lest . . .

• • Robert T. Reinhardt is a man of varied accomplishments. Readers of the 21,000 copies of your favorite family journal all over the country know him as the man who flits from plant to plant to report in honeyed terms on the burgeoning metalworking industry of the Far West. He never gets in a rut because several years of his earlier business career were spent in the culvert business. As a sideline, the culvert factory made perforated sheet metal irrigation pipe. As the water spurted through, it simulated rain. The California chambers of commerce looked on even simulated rain with jaundiced eye, and the product never gained very much acceptance.

Although he bears the name of the recent president of one of the state's starchiest women's colleges, Bob never has been able to overcome the urge to transform a remote strip of sand a few doors north of the Golden Gate into a pleasure strand resembling Atlantic City. He is the rudder of Stinson Beach affairs, so it was a matter of civic duty for him to conduct the Fourth of July bathing beauty contest. As a reporter, he had had more experience than anyone in town in leg work.

But Bob had his day to be judged. Confident that his experience would stand him in good stead, he entered a liar's contest conducted by the sports department of a San Francisco newspaper. He could almost visualize the No. 1 engraved cup gleaming on the mantel, but his experience with your f.f.j. proved too much of a drag. He only came in fifth. So, dear reader, you can be sure that almost everything you read in the "West Coast" column is true.

Sensational

"Early next year the first steel tubes to be made from Rhodesian iron ore will be turned out. . . ."

"A new steelmaking process, claimed to be as revolutionary as the Bessemer, has been discovered . . . light scrap and other metals can be fused with a mixture and melted into the finest quality steel ready for pouring into molds."—Newsfront, The Iron Age, July 8, 1948.

• • Wow! Tubes from iron ore; quality steel from light scrap and other metals, aluminum, maybe. Even Winchell will have a tough time topping these.

For Want of a Nail

• • Garrett Connors, Pittsburgh Steel Co. vice-president, acquired an elegant painting of the company's new blast furnace the other day. He and office manager Mac Leonard pooled their artistic talents to hang it in an appropriate spot. Mac pushed a chair up to the wall climbed up and G.C. was handing him the painting and hammer when they discovered they were stymied. Mac got down, turned the office inside out, finally grabbed his hat and dashed around the corner . . . to buy some nails.

Pittsburgh Steel, according to the official American Iron & Steel Institute rating, can produce 44,000 net tons of nails and staples a year with all stops pulled.

Parenthetically Speaking

"Scrambled steel (armor) casting facilities, surplus since the war, at Depew, N. Y., have been sold to the wartime operator, Symington-Gould Corp. of Rochester subject to the national security (recapture) clause."—The Iron Age, July 8, 1948, p. 124.

• • Let's be certain (positive) about this. Do you mean we have to take our armor scrambled (like General Rommel)?

Fish

• • For a couple of months now, we've been wondering what to do with an item we clipped out of International Nickel Company's *Nickel Topics*. Possibly, with the fishing season in full swing, some of our Izaak Waltons can help us out. Seems a commercial fishery up in Boston has developed a machine that will fillet 216,000 lb of haddock or cod in an 8 hr day. That's 45 fish a minute, it says here.

Mulling over the fact that one of its fair haired products, Ni-Resist, is used for the base of the machine, *Nickel Topics* didn't have much to say about how the machine worked. But N.T. did throw in something to the effect that "Fish are neither round, square nor rectangular, and vary widely in softness, firmness, length, radial dimensions and weight. Moreover, their slipperiness presented a peculiar problem."

Next time we're trying to decide what bait to use, we're going to take that out and read it over. There must be something secret there that will make the fish go for us at the rate of 45 a minute.



GOOD!

...from
every angle

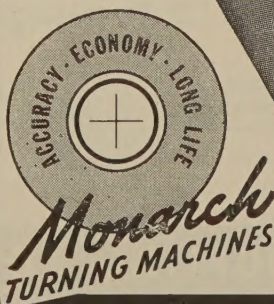
The New
**MONARCH
SERIES 60**
Long Bed Lathe

Yes, it's good to look at. It's even better to operate—this new Monarch Series 60 Lathe, now available in extra length beds.

Rigidity—so necessary in turning long jobs—is provided by heavier-than-average triangular bridge-type bed, with up to three heavy, box-type center legs. Accuracy is insured by such exclusive constructional details as the famous Monarch Flame Hardened and ground bedways. Speed of operation—a feature of every Monarch Lathe—is maintained in spite of the most exacting demands.

The Series 60 Long Bed Lathes are available in sizes up to 318" between centers for the 14" and 16" machines, up to 312" for the 18" and 20" machines. Write for descriptive literature.

THE MONARCH MACHINE TOOL CO.
Sidney, Ohio

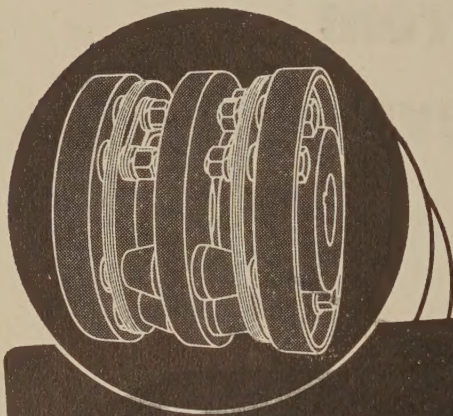


FOR A GOOD TURN FASTER—TURN TO MONARCH

THOMAS

flexible COUPLINGS

.... are specified by engineers, wherever
100% Operating Efficiency is demanded



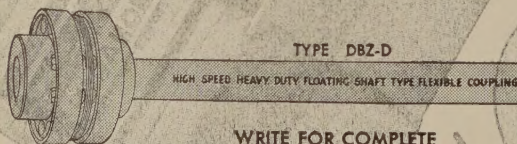
THOMAS
flexible COUPLINGS

provide for
Angular and Parallel
Misalignment as well
as Free End Float...

and Eliminate
**BACKLASH, FRICTION,
WEAR and CROSS-PULL**

NO LUBRICATION IS REQUIRED!

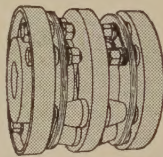
The Thomas All-Metal Coupling
does not depend on springs, gears,
rubber or grids to drive. All power
is transmitted by direct pull.



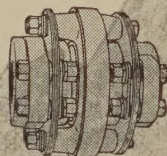
TYPE DBZ-D

HIGH SPEED HEAVY DUTY FLOATING SHAFT TYPE FLEXIBLE COUPLING

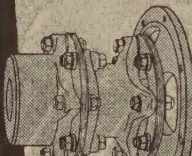
WRITE FOR COMPLETE
ENGINEERING CATALOG



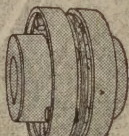
TYPE DBZ



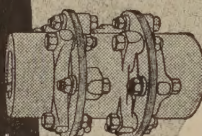
TYPE DSM



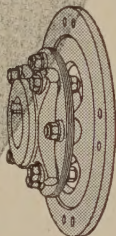
TYPE CM



TYPE ST



TYPE AM



TYPE SS

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Dear Editor:

1896 PRICES

Sir:

In looking through some personal records of my father, E. H. Titchener, who died last September at the age of 88, I uncovered a letter written by James A. Farrell, Pittsburgh Wire Co., on May 20, 1896 to our company. It is interesting to note in this letter that the price of bright basic steel wire is at present just about three times the price in 1896 and that also the carload freight rate today is almost exactly three times what it was 52 years ago. As you probably know, James A. Farrell was later president of U. S. Steel Corp.

PAUL F. TITCHENER
President

E. H. Titchener & Co.
Binghamton, N. Y.

• The mention of old letters brings to mind an 1816 epistle we saw in which the writer mentioned that he had left Pittsburgh to return to Kittanning, Pa., some 35 miles north-east of Pittsburgh, as he considered Pittsburgh too far west to ever amount to anything as an industrial center.—Ed.

PRECISION CASTINGS

Sir:

We are enclosing \$1.00 for a copy of your 89-page booklet "Precision Investment Casting—Lost Wax Process."

T. H. GRAY
Research Engineer

Westinghouse Electric Corp.
East Pittsburgh, Pa.

RADIO FREQUENCY HEATING

Sir:

I should like very much to have a reprint of the article "The Practical Economics of Radio Frequency Heating" from the June 10 issue.

S. A. MINTON
Metallurgist
General Motors Corp., Allison Div.
Indianapolis

NONFERROUS ALLOY MANUAL

Sir:

We are enclosing 25¢ to cover the cost of one copy of your "Nonferrous Alloy Specifications" booklet.

G. H. MARTIN
Allen-Bradley Co.
Milwaukee

REPRINTING PERMISSION

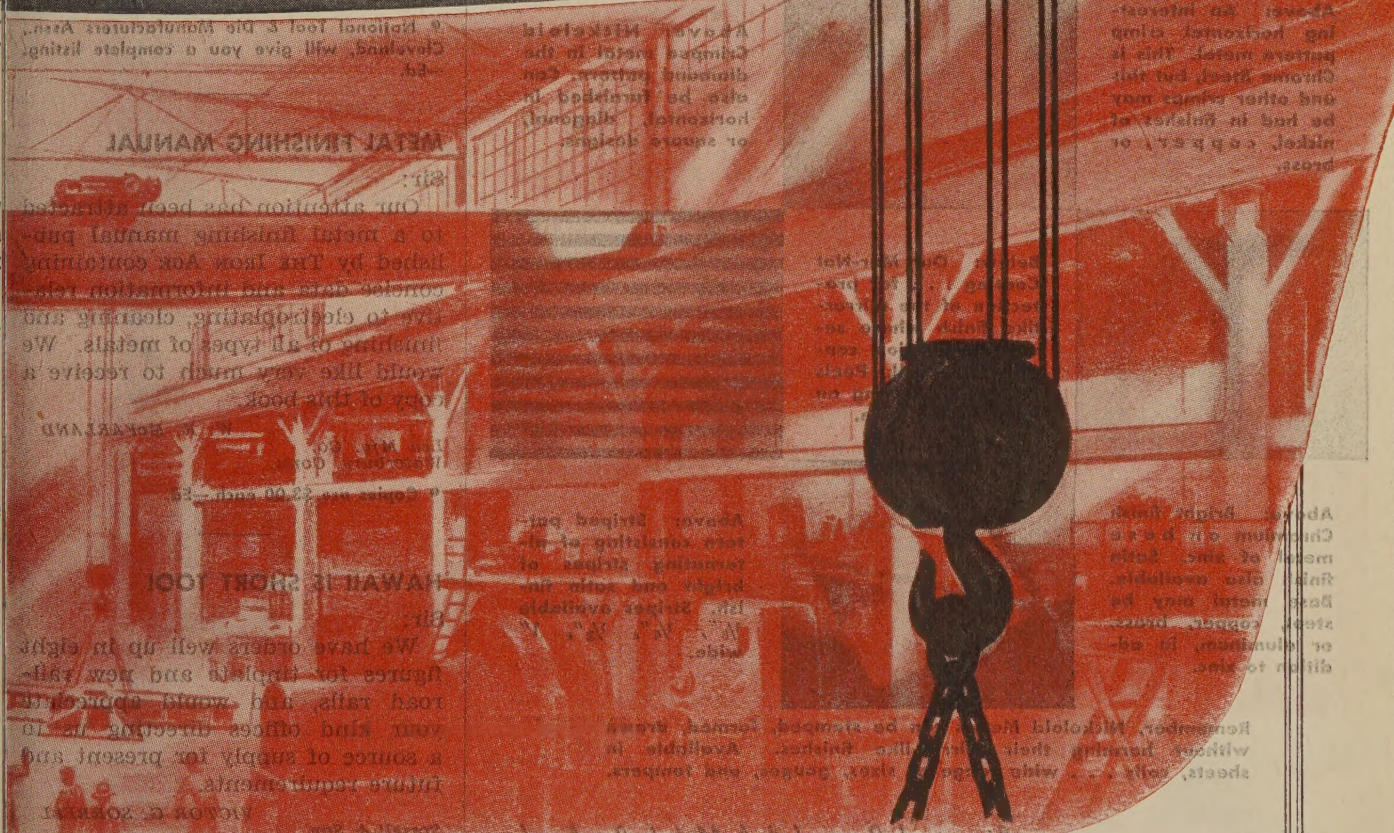
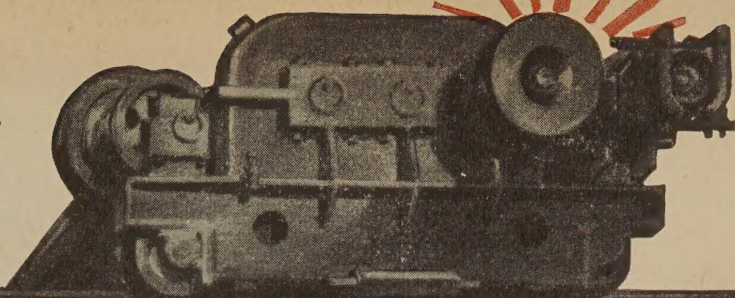
Sir:

We requested reprints of an article from the Aug. 17, 1944 issue "The Right and Wrong of Tim Study Computations." One copy was sent to us with the information that it was the last number in

NEW ANSWER

to an old problem!

P&H



The P&H Magnetorque AC Crane Control

Another old bugaboo in crane service has passed out! You no longer need DC cranes in those locations where the finest degree of control is desired.

P&H engineers have found a better way. The new P&H Magnetorque Control, accomplished through electro-magnetic forces, provides the smoothest, most accurate control ever put on overhead cranes. And it is done with the convenience and lower cost of AC power.

This newest P&H Added Value is but one of a long line of developments which have marked P&H's 60 years of leadership in crane building.

OVER 15,000 P&H CRANES SERVE AMERICAN INDUSTRY . . . FAR MORE THAN ANY OTHER



**OVERHEAD
CRANES**
4401 W. National Avenue
Milwaukee 14, Wis.

**HARNISCHFEGER
CORPORATION**

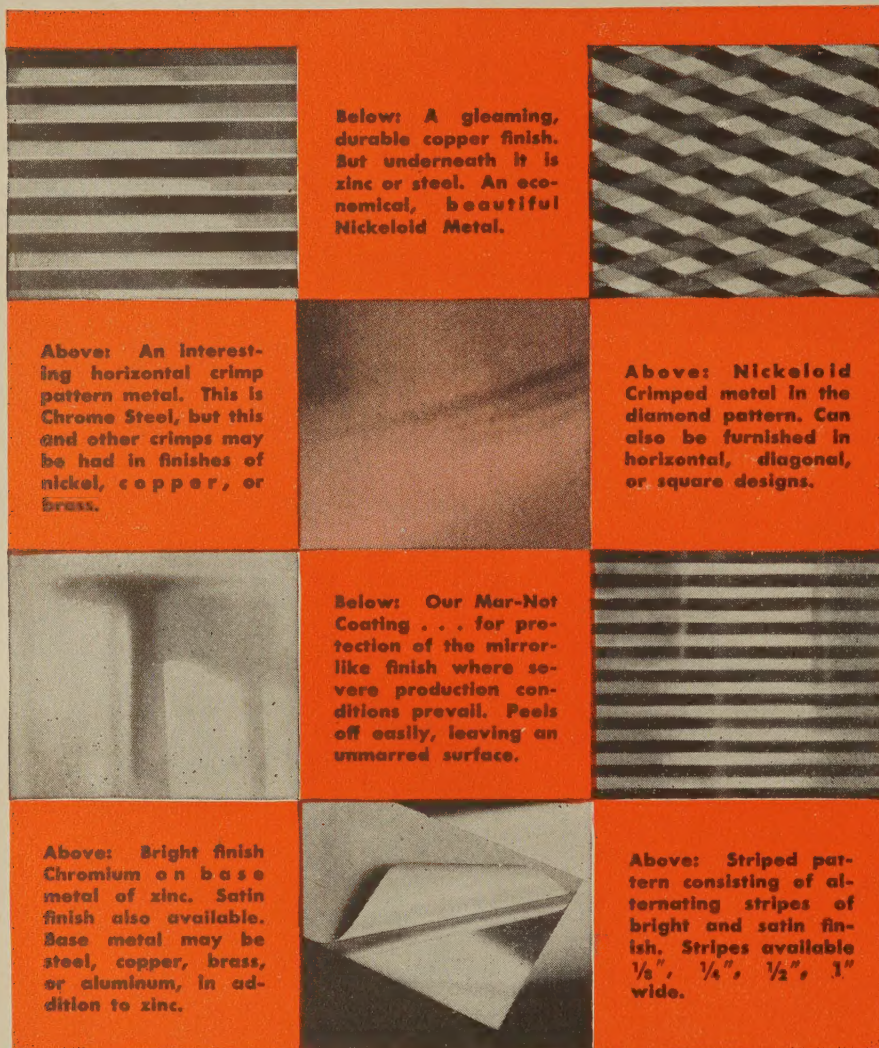
ELECTRIC CRANES - EXCAVATORS - ARC WELDERS - HOISTS - WELDING ELECTRODES - MOTORS



Magnetorque
Crane Control
is Another P&H
Added Value

Designers:

WHAT COULD YOU DO WITH THESE NICKELOID METALS?



Below: A gleaming, durable copper finish. But underneath it is zinc or steel. An economical, beautiful Nickeloid Metal.

Above: An interesting horizontal crimp pattern metal. This is Chrome Steel, but this and other crimps may be had in finishes of nickel, copper, or brass.

Above: Nickeloid Crimped metal in the diamond pattern. Can also be furnished in horizontal, diagonal, or square designs.

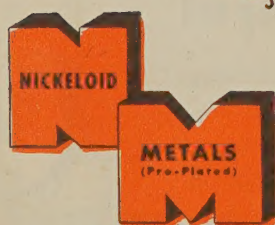
Below: Our Mar-Not Coating . . . for protection of the mirror-like finish where severe production conditions prevail. Peels off easily, leaving an unmarred surface.

Above: Bright finish Chromium on base metal of zinc. Satin finish also available. Base metal may be steel, copper, brass, or aluminum, in addition to zinc.

Above: Striped pattern consisting of alternating stripes of bright and satin finish. Stripes available $\frac{1}{8}$ ", $\frac{1}{4}$ ", $\frac{1}{2}$ ", 1" wide.

Remember, Nickeloid Metals can be stamped, formed, drawn without harming their mirror-like finishes. Available in sheets, coils . . . wide range of sizes, gauges, and tempers.

50 Years of Pre-plated Metal Leadership



NICKEL-CHROMIUM-BRASS-COPPER-ZINC
Electro-plated to all common base metals
ALSO LACQUERED COLORS
SHEETS AND COILS

OLDEST AND LARGEST PRODUCERS OF PRE-PLATED METALS

**AMERICAN
NICKELOID
COMPANY**
Established 1898
PERU 2, ILLINOIS

stock. We should like to mimeograph the article in order to have more copies, and therefore are asking consent in view of Iron Age's copyright protection.

R. McBRIDE
Research Engineering Dept.
United Automobile-Aircraft-Agricultural
Implement Workers of America
Detroit

• You have our permission to make up to 10 photostatic copies of that particular article for internal use. We have set this limitation of 10 copies on the basis of past experience as a means of protecting our copyright interest.—Ed.

TOOL AND DIE MAKERS

Sir:

I have been referred to you by the U. S. Chamber of Commerce in regard to an inquiry about obtaining lists of tool and die makers and companies in order to assist me in operating a small business I recently started.

ROBERT MAHONEY
J & M Broom Co.
Detroit

• National Tool & Die Manufacturers Assn., Cleveland, will give you a complete listing.—Ed.

METAL FINISHING MANUAL

Sir:

Our attention has been attracted to a metal finishing manual published by THE IRON AGE containing concise data and information relative to electroplating, cleaning and finishing of all types of metals. We would like very much to receive a copy of this book.

W. R. McFARLAND
Lea Mfg. Co.
Waterbury, Conn.

• Copies are \$3.00 each.—Ed.

HAWAII IS SHORT TOO!

Sir:

We have orders well up in eight figures for tinplate and new railroad rails, and would appreciate your kind offices directing us to a source of supply for present and future requirements.

VICTOR G. SORRELL
Sorrell & Son
Honolulu

• Lists of tinplate producers and rail producers have been sent.—Ed.

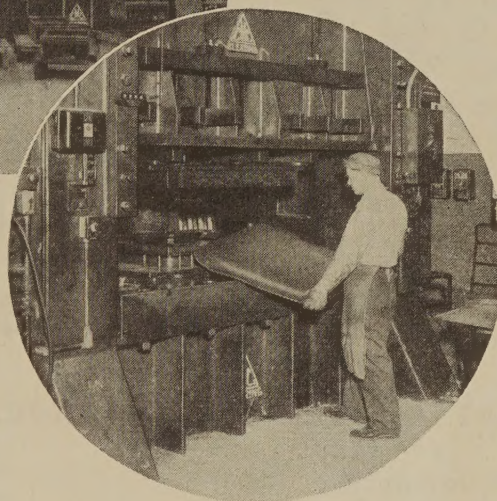
PRODUCTION CONTROL

Sir:

If the following tearsheets are available, we would appreciate receiving one copy each. "Production Control as Applied in a Farm Tractor Plant," Jan. 29, 1948 issue; "Production Control at Caterpillar,"



INSET: A completed piece, ready for assembly, at every stroke. Contrast this with molding, pouring, shaking, grinding, and drilling operations required to produce a comparable piece the old way.



GO ALL THE WAY WHEN YOU

ELIMINATE FOUNDRY EXPENSE



Casting metal is a slow method of production—grinding and drilling afterwards are expensive operations. The products or parts you manufacture—could they be changed to stampings? If so, any press can show you great savings in cost, but Clearing presses usually cut costs deepest.

That's not merely enthusiastic claim. It's a

statement of fact, and convincing proof is ready and waiting for any manufacturer who wants to turn out quality merchandise in quantity at bed rock costs. If that means you, get in touch with us.

In these pictures you see Clearing presses helping to keep quality up and costs down in a modern kitchen range plant. Whatever your line, they can probably do the same for you.

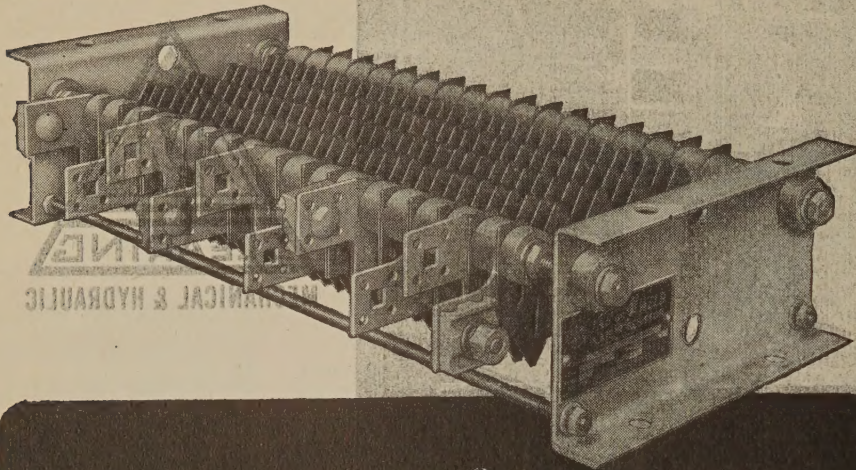
CLEARING MACHINE CORPORATION • 6499 West 65th Street • Chicago 38, Illinois

CLEARING

THE WAY TO EFFICIENT MASS PRODUCTION



WELDING eliminates the troublesome joints - stabilizes the resistance value - reduces maintenance



TRADE MARK

TAB WELD

PLATE RESISTORS

For CONTROLLER and STARTER DUTY

Look at these **7** important advantages

- 1-No burning at grid eyes
- 2-No burning at taps
- 3-No periodic tightening of clamping-nuts
- 4-Double insulation to ground
- 5-Easy to change taps
- 6-Internally clamped, independent of the end-frames
- 7-Available in capacities up to 150-amperes without paralleling.

Resistors used in electrical control service are usually mounted in out-of-the-way places. Because they are difficult to get at, periodic inspection is often neglected until trouble develops. Then, the mere tightening-up of bolts is frequently too late. Sections must be completely gone over, even torn down to repair the damage in concealed areas. **EC&M TAB-WELD Resistors eliminate this expense.** Tap-plates are permanently welded in place, affording *rigid terminals* for connecting external wires. These plates, located at frequent intervals, make it easy to shift taps. The spot-welding of mated ends of adjacent resistors stabilizes the resistance value, independent of the clamping nuts. Reduce maintenance costs with TAB-WELD Resistors.

WRITE FOR BULLETIN 942

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

June 26 and July 10, 1947; "Standard Systems Vital Aid to Management," Dec. 26, 1946; "Production Control for Small Plants," July 2, 1946; and "Putting Production Control to Work," May 16, 1946.

P. R. THORNTON

Celanese Corp. of America
New York

• Tearsheet copies have been mailed.—Ed.

TITANIUM FABRICATION

Sir:

We would like to obtain the article "Fabrication and Properties of Ductile Titanium" from the March 7, 1946 issue.

H. MUNRO

Carbone Corp.
Boonton, N. J.

• Tearsheets have been sent.—Ed.

FORD LABOR DECISION

Sir:

Can you advise where we can obtain a copy of the Ford labor umpire decision relating to paid holidays and referred to in an article by W. G. Patton in your issue of June 24?

E. P. MEYER

Geo. J. Meyer Mfg. Co.
Milwaukee

Malcolm Weldy, Industrial Relations Dept. Ford Motor Co., Dearborn, can furnish you with a copy.—Ed.

SCRAP PACKING PRESS

Sir:

We are interested in purchasing a scrap packing press and would appreciate it if you can let us know the names and addresses of companies which may be in a position to supply such a press.

ALBERTO J. AGUILAR

Altos Hornos de Mexico, S. A.

• A list of firms manufacturing such press has been sent.—Ed.

CARBIDE DRILLS

Sir:

We should be greatly obliged if you could send us a reprint of the article "Carbide Drills" which appeared in the June 17 issue.

JOHN L. ELLIS

Sintercast Corp. of America
New York

RESISTANCE WELDING WHEELS

Sir:

In the June 10 issue on your Newsfront page, the second paragraph states that the largest resistance welding wheels ever made are being installed on a new continuous pipe mill. Could you tell us who is building the equipment to manufacture the 30 in. dia.

FOLLANSBEE

POLISHED BLUE

The mirror-like finish of FOLLANSBEE POLISHED BLUE is the distinguishing characteristic of this superior steel sheet, one of the FOLLANSBEE SPECIALTY STEELS.

The mechanical and physical qualities of FOLLANSBEE POLISHED BLUE conform to the rigid requirements of design and production engineers. And, you can depend on the uniform blue, high gloss finish of FOLLANSBEE POLISHED BLUE to attract the attention of discriminating buyers.

Other products in the list of FOLLANSBEE SPECIALTY STEELS include:



COLD ROLLED STRIP
ELECTRICAL SHEETS
SEAMLESS TERNE ROLL ROOFING

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES • PITTSBURGH 30, PA.

Sales Offices: New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee.

Sales Agents: Chicago, Indianapolis, St. Louis, Kansas City, Nashville, Houston, Los Angeles.

San Francisco, Seattle, Toronto and Montreal, Canada.

Plants: Follansbee, W. Va., and Toronto, Ohio.

Follansbee Metal Warehouses: Pittsburgh, Pa., Rochester, N. Y., and Fairfield, Conn.

STEEL NEEDS SCRAP—KEEP IT MOVING

IMPROVED EFFICIENCY

WITH
**RUTHMAN
GUSHER**
COOLANT PUMPS

Photo courtesy American Broach & Machine Co.



For improved efficiency in your metal cutting operations specify Ruthman Gusher Coolant Pumps.

Oversized pre-lubricated bearings reduce maintenance cost. Electronically balanced rotating parts assure quiet operation and longer life. Split-second control of coolants, from a trickle to full volume, gives coolant flow where you want it when you want it.

Illustrated is an American VP-5-25-40 Broaching Machine equipped with a Model 11022-C 1/2 HP Gusher Coolant Pump.

Write now for Catalog 10-B



THE RUTHMAN MACHINERY CO.

1821 READING ROAD

CINCINNATI 2, OHIO



pipe? There is a large expansion in Canada of the oil industry due to new fields being developed in the West and it is possible that someone might consider the manufacture of pipe for oil pipe lines in Canada.

K. C. NOTMAN

Williams & Wilson Ltd.
Montreal

• The particular welding wheels mentioned are being built by Weiger Weed Div., Fansteel Metallurgical Corp., North Chicago, Ill. for a new mill of Yoder Co., Cleveland.—Ed.

INVESTMENT CASTING SURVEY

Sir:

Will you kindly forward three copies of the article "A Critical Survey of Investment Casting" which appeared in the May 6 issue and was concluded in the May 13 issue.

S. H. CHRISTY

Crucible Steel Co. of America
New York

CUPOLA HOT METAL

Sir:

The first item on the Newsfront page of the May 20 issue mentions cupola production of hot metal for charging into the openhearth at costs less than the going price for pig iron, with the cupolas, which function alternately and in pairs, being capable of up to 98 hr continuous operation. Please refer us to the proper sources for additional information on this subject.

A. F. KOZEL

Western Electric Co., Inc.,
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Indexed in the Industrial Arts Index.
Published every Thursday. Subscription
Price United States, its Territories and
Canada \$8; other Western Hemisphere
Countries \$15; Foreign Countries \$20 per
year. Single copy, 35c. Annual Review
Number, \$2.00.

Cable Address, "Ironage" N. Y.

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The Wrong Target

IN the lexicon of democracy, monopoly is an evil word. It connotes economic power which, exercised by private parties, is presumably always abused, to the injury of the consumer, the public and the worker. Hence, the fervor of politicians in denouncing and officials in suppressing it.

It is possible that a sense of "liberal" mission may have operated on the Supreme Court when, by a six-to-one decision in April, it decided that the sale of cement on a basing point price system was wicked, conspiratorial and monopolistic. A 44-page opinion by Justice Black fully supported the findings of the FTC regarding the turpitude of the cement industry.

The Court failed to consider a question raised by GE as *amicus curiae* regarding the position of an individual producer who in good faith absorbs a freight charge in order to meet competition at the point of delivery. One may only assume that the presence of good faith depends upon the exclusive discretion of the FTC.

In theory at least, Anglo-Saxon common law abhors a legal vacuum. When a man takes action of any kind that affects rights and legal taboos, he should know in advance what the rules are. The cement case has left a vast body of established commercial practice in that vague twilight zone where no man may know when he is within or without the law.

As a result of this insoluble doubt, the steel industry finally and reluctantly is quoting prices on an f.o.b. basis. That this will promote market justice and eliminate monopoly is extremely doubtful. On the contrary, it will tend to create a series of insulated marketing areas. At the core of each such area will be a producer whose true power of monopoly will now be assured by a freight penalty which no competitor may absorb lest he incur the displeasure of the FTC. As matters stand now, a consumer may have the privilege of choosing between two or more competitors for his business at the same price only when freight charges happen to coincide.

It is astonishing how myopic zeal can be when animated by a crusading spirit and warped by particular prejudice. The great body of consumers who have bought under the basing point system found it satisfactory. There was no overwhelming pressure from the apparent direct victims for a change in the long-established price practices of the industries using basing points. The complainant in this case is an administrative body, notorious for its hostility to big business. The judges of the final court are men appointed by a President who reached and retained the White House on the theory that a friendly and prosperous business community was a political liability.

It is not unfair to suspect that the presentation of the cement case was evangelical, that its adjudication was ulterior, that its effects will be mischievous. At a time when 34 major industries are organized from 80 pct to 100 pct by tight labor monopolies, it is strange that an arm of the government cannot find more convincing instances of real restraint than those afforded by the pricing practice of the cement industry.

Joseph Stagg Lawrence

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► Cold-finished bar users are in a tizzy. But many producers are in a worse state. This item was just about the hardest hit of all in the f.o.b. switch. The Pittsburgh district makes almost a million tons of cold-finished bars annually -- uses only a small part of them. Carload rail freight to Detroit is over \$9.00 a ton; to New York or Chicago, over \$11.00 a ton. A partial answer -- ship more by truck.

► Since the first commercial installation of a continuous casting unit in the Eastern plant of a nonferrous producer, some 300 million lb of phosphorus de-oxidized copper billets have been shipped to the trade.

► The emphasis in new truck production has shifted strongly from heavy duty trucks a year ago to light duty trucks. One manufacturer reports that during 1947 two trucks out of three were in the medium and heavy duty classification. Today the proportions are reversed. Two trucks out of three are light duty jobs. The most popular model for some truck producers is the half ton pickup which serves both as a passenger car and truck for some families.

► The steel industry now has the green light on steel output for the rest of the year. Even though 1.6 million tons of steel were lost through the coal strike earlier in the year, it now looks as if the steel industry can turn out as much as 88 million tons this year. If it makes the grade, it will be a peace-time record and approach the wartime record of 1944 when more than 89.6 million tons were made.

► With rising consumption of lead scrap, some sources such as battery scrap-ping have been drying up. First quarter smelter supplies from this source dropped 14,000 tons, or more than 12 pct over the same period last year. Secondary lead output for March reached 52,000 tons, highest for this year.

► A solid industrial truck tire with a soft inner construction has been developed to provide greater cushioning effect on powered industrial trucks. The new tire which is now in mass production is reported to have vibration absorbing characteristics comparable to pneumatic tires, plus high load capacity and relatively trouble-free performance.

► When Philip Murray's steelworkers union opens contract negotiations next year, it will be sure to plug for pension discussion. When and if the union fulfills the requirements of the Taft-Hartley Act on the non-Communist pledge, it will be able to take advantage of the NLRB ruling that unions can enter into the pension plan arguments. With the mineworkers sitting pretty on pensions and with the steel companies paying their share to the mineworkers pension fund, it is only natural for the steelworkers to ask for their pension plan expansion.

► Nonferrous metals producers are studying the implications of f.o.b. pricing if applied to aluminum, copper, lead and zinc. Principal producers say that there is no reason to expect early action, but all recognize the pressure exerted by the precedent of the move taken by the steel industry.

A major stumbling block is the pricing system's intrinsic price raising effect to most consumers that has already brought forth congressional criticism. In addition major producers are opposed to the prospect of higher prices for non-ferrous metals, although the current round of wage increases may change this position.

► If steel allocations are foisted on the steel industry, it may be their own fault. The success of the voluntary allocations plan is the key to the crux of the matter. If too many people in defense and other preferred categories don't get what steel they need, more stringent controls may come. It behooves the steel companies to keep their skirts clean and fill the promises that are being made at Washington.

► In a competitive market, under f.o.b. method of pricing, prevailing legal opinion holds that a price cut to meet a competitive situation must govern the price of all sales of the product concerned from that producing point.

► It is reported that one Detroit firm is planning to move its plant, or at least a part of it to Pittsburgh to take advantage of lower freight rates. Reason for this move is that the company's chief supplier of hot-rolled strip is abandoning this area as rapidly as possible.

► It is reported that a switch button controlled antenna mast of magnesium which weighs only half as much as a comparable steel mast has been developed. The company which specializes in magnesium products has received an order for ten of the new masts from the Army Signal Corps.

How To Weld Clad Steels



Step by step procedures of welding clad steels, including steels with such cladding alloys as AISI 405, 410, 430, 301, 302, 304, 316, 321, 347, nickel, Monel, and Inconel, are outlined in this article. Weld preparation, weld metals, bead sequence, overlays, backup strips, metallurgical and physical factors, stress relief, hot working, and other factors affecting satisfactory welding of clad steels are described.

◦ ◦ ◦

By L. W. WILLIAMS
Welding Engineer
Lukens Steel Co., Coatesville, Pa.

◦ ◦ ◦

SINCE the essential requirement of the clad surfaces of clad steels is corrosion resistance, every precaution must be taken to insure that the fabricated structure will give the required service. As the weld that joins the clad steel plates becomes part of the corrosion-resistant material, it must maintain the integrity of the clad surface and supply the necessary structural strength. Clad materials are readily welded if the proper design of joint and the proper welding procedure are employed. The preferred procedure in butt-welding material up to 1.25 in. thick should be used on all types of clad materials. Fig. 1 illustrates this procedure, which is as follows:

(1) The plate edges should be machined accurately, maintaining a lip of steel 1/16 in. (+1/32 in., —0.00 in.) above the cladding. The thickness of this lip should be uniform, as it acts as a barrier to prevent pickup of the high alloy cladding material in the mild steel weld. Preparation details for this weld are shown in figs. 2, 3, and 4 for flat, horizontal and vertical welding.

(2) The vessel should be assembled and the alignment of the clad edges should be established. The steel side should be tack-welded with any good carbon steel electrode. Good fitup and alignment is important in the production of the joint.

(3) The weld should be completed first on the steel side, using an electrode that will develop the required characteristics of the backing material. The root bead should be fused to the base of the steel lip, but should not penetrate into the cladding. If the steel root bead penetrates into the high alloy cladding metal, a hard, brittle, non-ductile material is formed, as shown in fig. 5.

Close control of the depth of penetration of the root bead on the steel side is obtained by the use of a larger bevel than is used for steel welding and or the use of smaller diameter electrodes. The care required to produce adequate but not excessive penetration of the root pass is more than justified when consideration is given

to the reduced amount of back chipping or grinding required and the minimum consumption of high alloy, high cost electrodes. Inadequate bevel and too large diameter electrode results in welds are shown in figs. 6A and 6B.

If the cladding is penetrated by the steel root bead because of poor fitup, improper joint design or the use of too hot or too large an electrode, martensite will form in the root pass as shown in fig. 5. This will result in cracking, inability to back chip or to make bend tests, or a combination of these characteristics. When the penetration of the steel root bead is too shallow, the area to be removed by chipping or grinding will be excessive and large amounts of alloy weld metal will be required. Fig. 7 illustrates this condition.

Welding electrodes for the steel side should be selected to agree with the tensile strength of the backing steel. When special backing steels are used for high (moly steels) or low (nickel steels) temperature properties, the electrode should be of the same analysis or of one that will produce the required properties.

In flat welding, AWS E6020 or E6030 electrodes should be used. The root bead should be welded with proper amperage and at a rather high rate of travel to insure penetration. In vertical or overhead welding, E6010 or E6011 electrodes should be used, and care taken to get proper root bead penetration.

Good fitup is important in welding clad steels. In cylindrical vessels, where heads are to be attached, it is important that the plates be laid out to match the ID of the heads. Spun heads thicken on the straight flange section and the thickening is unpredictable. Consequently, individual heads should be checked and the steel plates should be matched to these heads. If the fitup is poor, E6012 or E6013 electrodes should be used in all positions to reduce penetration and the danger of pickup of the cladding material.

The chart in table I gives current ranges for various electrodes used in welding the steel side of clad plate. The high side of the range may be used for flat or horizontal welding, while the

TABLE I Current Ranges for Various Electrodes						
AWS Electrode Type →	E6010	E6011	E6012		E6020 or E6030	
Current →	dc	ac	dc	ac	dc	ac
Polarity →	Reversed	.....	Straight	.....	{ Straight or Reversed	or
Electrode Diam., in. ↓						
1/8	80 to 120		90 to 130		110 to 150	
5/32	120 to 160		120 to 180		130 to 190	
3/16	140 to 220		140 to 220		180 to 230	
1/4	200 to 300		200 to 300		250 to 330	
5/16	250 to 400		250 to 400		350 to 450	

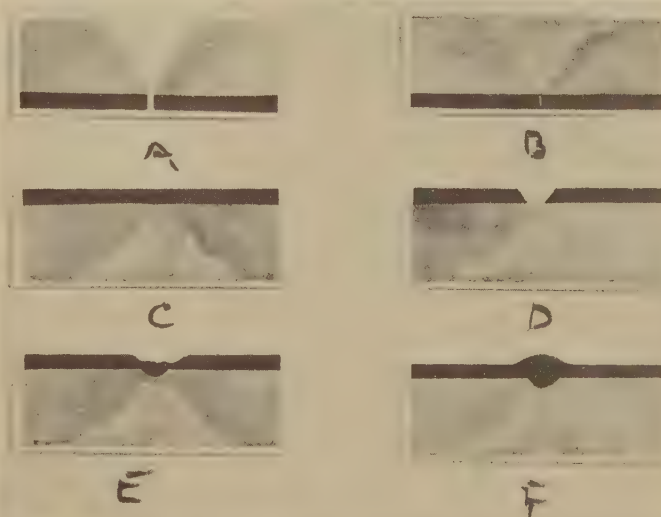
medium range should be used for vertical or overhead welding.

(4) The clad side of the joint should be chipped or ground down to clean, sound weld metal. Chipping or grinding, or both, can be used to prepare the clad side after the steel side has been welded. In grinding or chipping down to clean, sound weld metal prior to any alloy welding, the unfused area that would act as a stress raiser is removed and the slag remaining from the backing steel is also removed. This could gasify upon application of the alloy beads and cause porosity. When chipping light gage cladding, a 3/16 or 1/4 in. round nose chisel is recommended. On clads over 3/4 in. thick, a 3/8 or 1/2 in. round nose chisel can be used. Chipping has an advantage over grinding since the chip will separate for as long as any unfused section remains.

In grinding, a high speed cutoff wheel should be used. It is often advantageous to chip a light groove first to provide a guide for the grinding wheel, since the high speed of the grinders tends to throw the wheel. Normally, on cladding up to 1/2 in. thick, a 1/4 in. thick, 6-in. diam wheel is used for the initial cut. After the groove is ground to the required depth, a 1/4 in. thick, 6-in. diam wheel can be used to open up the top section of the groove and provide adequate space

FIG. 1 - Welding sequences for clad steels.

- A. Plates beveled and fitted for welding.
- B. Steel side welded. Note penetrations.
- C. Ready for chipping or grinding.
- D. Clad side prepared for welding.
- E. Root pass welded, clad side.
- F. Finish pass welded, clad side.



Gage, In.	Angle°		Single "V"		Single "U"	
	A	B	Passes	Electrode Diam In.	Passes	Electrode Diam In.
1/4	45	—	1 2	1/8 5/32		
3/8	45	—	1 2 & 3	1/8 5/32		
1/2	45	—	1 2 & 3	1/8 5/32		
3/4	35	10	1 & 2 Bal.	5/32 3/16 or 1/4	1 2-6	5/32 1/4
1	30	10	1 & 2 Bal.	5/32 3/16 or 1/4	1 2 & 3 Bal.	5/32 1/4 1/4 or 5/16
1 1/4	30	10	1 & 2 3 & 4 Bal.	5/32 3/16 1/4 or 5/16	1 2 & 3 Bal.	5/32 1/4 1/4 or 5/16
1 1/2	—	10			1 2 & 3 Bal.	5/32 1/4 1/4 or 5/16
2	—	10			1 2 & 3 Bal.	5/32 1/4 1/4 or 5/16

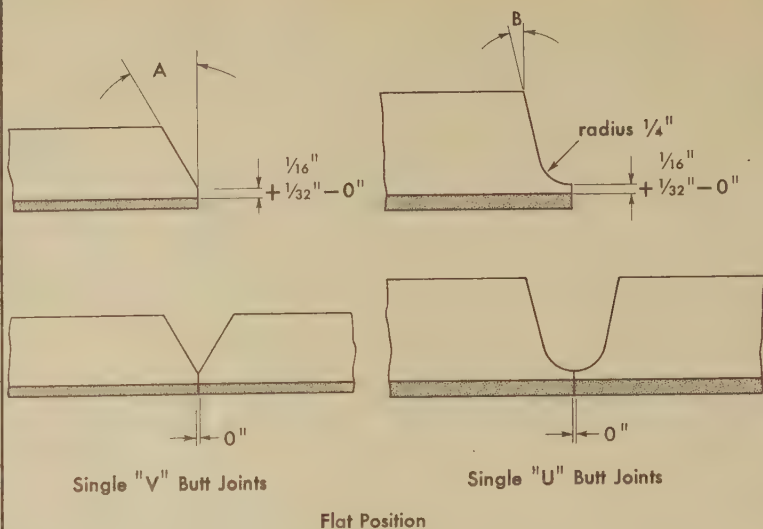


FIG. 2 - Welding details for the steel side of clad plate, for welding in flat position.

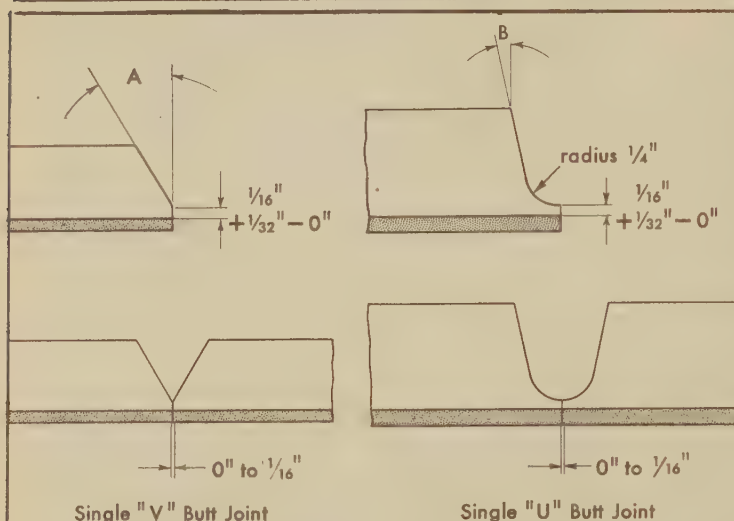


FIG. 3 - Welding details for the steel side of clad plate, for welding in vertical position.

Gage, In.	Angle°		Single "V"		Single "U"	
	A	B	Passes	Electrode Diam In.	Passes	Electrode Diam In.
1/4	45	—	1 2	1/8 5/32		
3/8	45	—	1 2 & 3	1/8 5/32		
1/2	45	—	1 2 & 3	1/8 5/32		
3/4	35	10	1 2-4	1/8 3/16	1 2-4	1/8 3/16
1	30	10	1 2-8	5/32 3/16	1 2-5	5/32 3/16
1 1/4	30	10	1 2-10	5/32 3/16	1 2-6	5/32 3/16
1 1/2	—	10			1 2-8	5/32 3/16
1 3/4	—	10			1 2-10	5/32 3/16
2	—	10			1 2-12	5/32 3/16

Gage In.	Angle°			Single "V"		Single "U"		Single "J"	
	A	B	C	Passes	Electrode-Diam In.	Passes	Electrode-Diam In.	Passes	Electrode-Diam In.
1/4	45	—	—	1 2-3	1/8 5/32				
3/8	45	—	—	1 2-5	1/8 5/32				
1/2	40	—	30	1 2-15	5/32 3/16			1 2-4	5/32 3/16
3/4	30	22 1/2	30	1 2-21	5/32 3/16	1 2-10	5/32 3/16	1 2-7	5/32 3/16
1	30	22 1/2	30	1 2-27	5/32 3/16	1 2-15	5/32 3/16	1 2-11	5/32 3/16
1 1/4	30	22 1/2	30		5/32 3/16	1 2-21	5/32 3/16	1 2-16	5/32 3/16
1 1/2	—	22 1/2	30			1 2-28	5/32 3/16	1 2-22	5/32 3/16
1 3/4	—	22 1/2	30			1 2-36	5/32 3/16	1 2-29	5/32 3/16
2	—	—	30					1 2-37	5/32 3/16

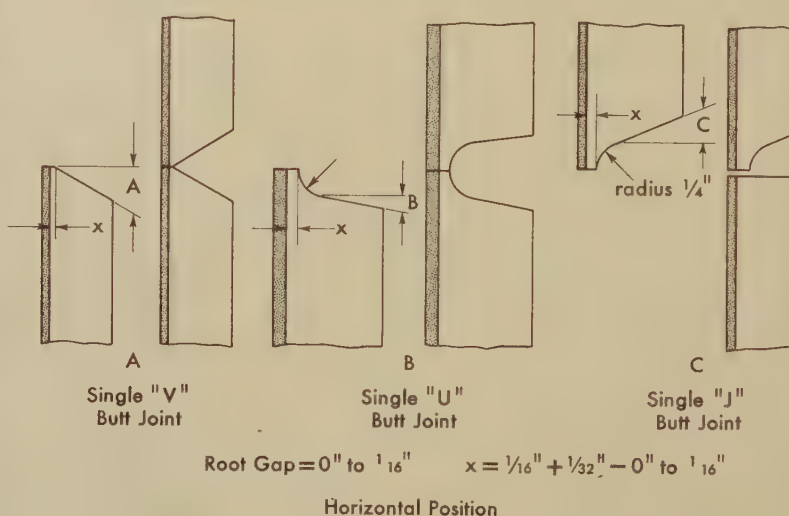


FIG. 4 - Welding details for the steel side of clad plate, for welding in horizontal position.

in which to manipulate the welding electrode. On heavy cladding, a 1/4-in. thick wheel should be used for the first cut, followed by a 3/8- or 1/2-in. thick wheel to provide groove width. The high speed grinder tends to smear the metal and hide unfused areas.

The depth of the chipped or ground groove is controlled by the extent of the unfused lip or land zone. When proper welding procedures are coupled with good workmanship, the depth of groove below the cladding should not be more than 1/16 in., or 50 pct of the cladding thickness in heavy gage plates. Copper sulfate-hydrochloric acid solutions may be used in the chipped or ground groove to reveal that the unfused area has been removed.

If the groove depth is excessive, a steel bead may be applied from the clad side, taking care to prevent pickup or penetration of the cladding. Also, if because of lack of penetration in the steel side the depth of the groove is excessive, the width of the groove should be increased proportionately to allow electrode manipulation. The width of the groove should be held to approximately the following dimensions:

Plate Thickness, In.	Width of Groove, In.	
	10 Pct Clad	20 Pct Clad
3/16 to 1/2	1/4	5/16
9/16 to 1	3/8	1/2
Over 1	1/2	3/4

The edges or shoulders of the groove should have generous radii to permit proper fusion, to prevent entrapment of the slag, and to overcome undercuts of the clad surface. For horizontal welds, the bottom edges of the groove can be squared off to give an adequate shelf.

(5) The clad side of the joint should be welded using the recommended electrodes for the different types of cladding, as shown in table II. Selection of the electrodes for welding the clad

side must be directed toward maintaining continuity of the corrosion-resistant surface and to give the required structural strength. Some electrode elements are lost in the arc, and the transfer efficiency of oxidizable elements depends upon the electrode coating. Both lime and titania base coatings are available for straight chromium and chromium-nickel steels, but lime coatings have a better recovery rate.

Welding on the clad side first in order to prevent pickup of the steel backing material by the alloy welding material generally results in a hard, brittle steel weld metal, as the alloy weld metal and cladding material are picked up by the steel weld metal. This pickup (amount of penetration) will range from 10 to 40 pct. When steel is welded on alloy, the cooling rates will result in a hard brittle material, as shown in fig. 8. When an alloy is welded on steel, however, the deposited weld will be soft and ductile.

Narrow amperage and voltage ranges are required for the alloy electrodes. These ranges are critical and the recommendations of the manufacturer should be followed. Because of the high electrical resistance of alloy wire, electrodes become white hot if excessive currents are used. This causes the coating to flake off and porous welds result. If the current is low, the metal will freeze before complete slagging has taken place, or lack of penetration may result. The voltage range is restricted and a short arc should be held to conserve the oxidizable elements.

Alloy electrodes are generally used with dc, reversed polarity (electrode positive, work negative). This results in faster melting of the electrode and less heat input into the steel backing material, avoiding excessive penetration of the backing metal. Ac high alloy electrodes are also available.

Under some corrosive conditions, it is re-

TABLE II
Welding Electrodes to Be Used for Various Cladding Metals

Cladding	1 Cover Exposed Steel With First Pass or Layer With:	2 Complete Balance of Weld With:	3 In Welds Not Exposed to Corrosion, Weld Alloy to Steel With:
405	25-20; 25-12; 18Cr ¹	2520; 25-12; 18Cr ¹	25-20; 25-12
410	25-20; 25-12; 18Cr ¹	2520; 25-12; 18Cr ¹	25-20; 25-12
14-16Cr.	25-20; 25-12; 28Cr ¹	2520; 25-12; 18Cr ¹	25-20; 25-12
430	25-20; 25-12; 28Cr ¹	2520; 25-12; 18Cr ¹	25-20; 25-12
301	25-20; 25-12	25-20; 25-12; 19-9	25-20; 25-12
302	25-20; 25-12	25-20; 25-12; 19-9	25-20; 25-12
304	25-20; 25-12	25-20; 25-12; 19-9	25-20; 25-12
308	25-20; 25-12	25-20; 25-12; 19-9	25-20; 25-12
321	25-20 Cb; 25-12Cb	25-20Cb; 25-12Cb; 19-9Cb	25-20; 25-12; 25-20Cb; 25-12Cb
347	25-20 Cb; 25-12Cb	25-20Cb; 25-12Cb; 19-9Cb	25-20; 25-12; 25-20Cb; 25-12Cb
309	25-20	25-20	25-20; 25-12
310	25-20	25-20	25-20; 25-12
316	25-20Mo; 25-12Mo	25-20 Mo;; 25-12Mo; 19-9Mo	25-20 25-12; 25-20Mo; 25-12Mo
"L" Nickel	Nickel	Nickel	Nickel; 80Ni-20Cr, 25-20Cb; 25-12Cb
Nickel	Nickel; 80Ni-20Cr ²	Nickel; 80Ni-20Cr ²	Nickel; 80Ni-20Cr, 25-20; 25-12
Monel	Nickel	Monel	Nickel
Inconel	80Ni-20Cr	80Ni-20Cr	80Ni-20Cr; 25-20; 25-12

1—Must be used under certain corrosive conditions.
2—May be used under certain corrosive conditions.



FIG. 5 - This weld was made with the bevel extending through the full thickness of the composite plate. The darkly etched constituent at the root of the steel weld is caused by alloy pickup. Welds like this are hard to back chip and the hardness and brittleness may result in cracking.



FIG. 6A - The insufficient penetration and the slag inclusions at the scarf face of this weld were caused by using too large diameter electrode at the root pass.



FIG. 6B - Insufficient bevel opening caused the lack of penetration of the steel weld metal in this weld.



FIG. 7 - Poor penetration and incomplete fusion of the steel weld metal necessitated the use of an excessive amount of alloy weld metal in this 18-8 clad steel. The root pass was made with a 25-20 electrode and the balance of the weld with 18-8 electrode material.

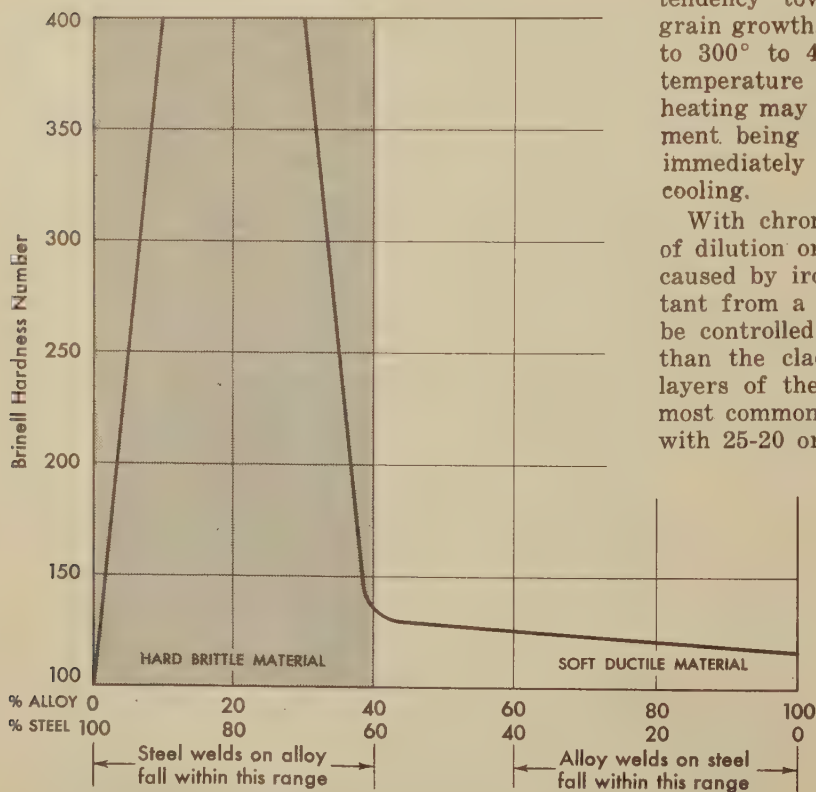


FIG. 8 - This hardness curve shows how steel welded on the clad side (or alloy side) results in a hard, brittle weld bead.

quired to weld straight chromium cladding with straight chromium electrodes. Contamination or dilution of the weld metal by pickup of the backing steel may be eliminated or guarded against by using an electrode containing higher chromium than the cladding material, or by using a number of successive thin layers of the same analysis as the cladding.

It is general practice to weld straight chromium cladding with an austenitic electrode to eliminate brittleness in the weld. Austenitic chromium-nickel electrodes of the 25-20 or 25-12 types are normally used. These electrodes eliminate the hard, brittle structure and the large grain size encountered in straight chromium weld metal. However, they will not eliminate the brittle structure in the heat-affected zones of the base metal. A stabilized austenitic electrode should be used if the weldment is to operate in the carbide precipitation temperature range, or if stress relieving heat treatment is required. Austenitic electrodes have a 40 to 60 pct higher coefficient of thermal expansion than straight chromium material, and the location of joints and the nature of restraint should be considered when the weldment is to operate over a wide range of temperatures. Galvanic action resulting from the presence of a more noble metal should also be considered from the standpoint of corrosion. Welding details for welding straight chromium clad with straight chromium and with austenitic electrodes are shown in figs. 9 and 10.

Type 405 cladding metal has a small percentage of aluminum added to alleviate the air hardening tendencies of the basic alloy. Preheating is not required unless heavy gages are to be welded.

Types 410 modified and 430 modified are somewhat brittle in the as-welded condition. Type 410 has pronounced air hardening characteristics unless of the low carbon grade. Type 430 has a tendency towards brittleness, associated with grain growth. These materials may be preheated to 300° to 400°F, and should be held at that temperature range during welding. Such preheating may be done at the weld zone, the weldment being given a stress relieving treatment immediately following welding and prior to any cooling.

With chromium-nickel cladding, consideration of dilution or contamination of alloy weld metal caused by iron pickup from the steel is important from a corrosion standpoint. Dilution can be controlled by using a higher alloy electrode than the cladding alloy or by depositing thin layers of the same alloy as the cladding. The most common procedure is to run the root bead with 25-20 or 25-12 electrodes and complete the

(Continued on page 80)

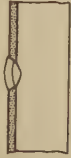
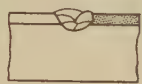
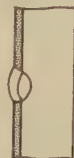
Position	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 10% clad	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 20% clad $\frac{5}{16}$ to 1 incl. 10% clad	$\frac{5}{16}$ to 1 incl. 20% clad $\frac{1}{8}$ and up 10% clad	$\frac{1}{8}$ and up 20% clad
Flat				
Passes	1	1 & 2	1 to 4	1 to 5
Elect. Diam.	$\frac{1}{8}$	$\frac{1}{8}$ - $\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$
Horizontal				
Passes	1 to 4	1 to 2	1 to 3	1 to 4 or 5
Elect. Diam.	$\frac{1}{8}$	$\frac{1}{8}$ - $\frac{5}{32}$	$\frac{1}{8}$ - $\frac{5}{32}$	$\frac{1}{8}$ - $\frac{5}{32}$
Vertical				
Passes	1	1 & 2	1 & 2	1 & 2
Elect. Diam.	$\frac{1}{8}$	$\frac{1}{8}$ or $\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$
Overhead				
Passes	1 & 2	1 to 3	1 to 6	1 to 10
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$

FIG. 9 - Welding details for welding straight chromium clad with straight chromium electrodes. The root layer should be ground in multiple pass welds.

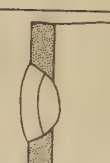
Position	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 10% clad	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 20% clad $\frac{5}{16}$ to 1 incl. 10% clad	$\frac{5}{16}$ to 1 incl. 20% clad $\frac{1}{8}$ and up 10% clad	$\frac{1}{8}$ and up 20% clad
Flat				
Passes	1	1 & 2	1	1
Elect. Diam.	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$
Horizontal				
Passes	1 & 2	1 to 3	1 to 7	1 to 3
Elect. Diam.	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$
Vertical				
Passes	1	1 & 2	1 & 2	1 & 2
Elect. Diam.	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$
Overhead				
Passes	1 & 2	1 to 3	1 to 6	1 to 10
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$

FIG. 10 - Welding details for welding straight chromium clad with austenitic electrodes (25-20, 25-12 types). The root layer should be ground in multiple pass welds.

Position	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 10% clad	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 20% clad $\frac{9}{16}$ to 1 incl. 10% clad	$\frac{9}{16}$ to 1 incl. 20% clad $1\frac{1}{8}$ and up 10% clad	$1\frac{1}{8}$ and up 20% clad
Flat				
Passes	1	1 & 2	1	1 2 & 3
Elect. Diam.	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$ $\frac{3}{16}$	$\frac{5}{32}$ $\frac{3}{16}$
Horizontal				
Passes	1 & 2	1 to 4	1 to 7	1 to 3 4 to 8
Elect. Diam.	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$ $\frac{5}{32}$ or $\frac{3}{16}$
Vertical				
Passes	1	1 & 2	1 & 2	1 & 2
Elect. Diam.	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$
Overhead				
Passes	1 & 2	1 to 3	1 to 6	1 to 10
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$

FIG. 11 - Details for welding chromium-nickel clad (18-8) with austenitic electrodes (25-20, 25-12 types). The root layer should be ground in multiple pass welds.

Position	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 10% clad	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 20% clad $\frac{9}{16}$ to 1 incl. 10% clad	$\frac{9}{16}$ to 1 incl. 20% clad $1\frac{1}{8}$ and up 10% clad	$1\frac{1}{8}$ and up 20% clad
Flat				
Passes	1 & 2	1	1 to 4	1 & 2 3 to 5
Elect. Diam.	$\frac{1}{8}$	$\frac{1}{8}$ $\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$ $\frac{3}{16}$
Horizontal				
Passes	1 to 4	1 & 2 3 to 5	1 to 7 or 8	1 to 3 4 to 8
Elect. Diam.	$\frac{1}{8}$	$\frac{1}{8}$ $\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$ $\frac{5}{32}$ or $\frac{3}{16}$
Vertical				
Passes	1	1 & 2	1 to 3	1 to 3
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$
Overhead				
Passes	1 & 2	1 to 3	1 to 6	1 to 10
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$

FIG. 12 - Details for welding chromium-nickel (25-12, 25-20 types) with austenitic electrodes (25-20 type). The root layer should be ground in multiple pass welds.

Position	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 10% clad	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 20% clad $\frac{3}{16}$ to 1 incl. 10% clad	$\frac{3}{16}$ to 1 incl. 20% clad 1 $\frac{1}{8}$ and up 10% clad	1 $\frac{1}{8}$ and up 20% clad
Flat				
Passes	1 to 3	1 to 4	1 & 2	1 to 8
Elect. Diam.	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{5}{32}$
Horizontal				
Passes	1 to 4 or 5	1 to 5 or 6	1 to 9	1 to 15 or 16
Elect. Diam.	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
Vertical				
Passes	1 & 2	1 & 2	1 to 3	1 to 3
Elect. Diam.	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
Overhead				
Passes	1 to 3	1 to 6	1 to 7	1 to 11
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$

FIG. 13 - Details for welding nickel clad with nickel electrodes. The root layer should be ground.

Position	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 10% clad	$\frac{1}{4}$ to $\frac{1}{2}$ incl. 20% clad $\frac{3}{16}$ to 1 incl. 10% clad	$\frac{3}{16}$ to 1 incl. 20% clad 1 $\frac{1}{8}$ and up 10% clad	1 $\frac{1}{8}$ and up 20% clad
Flat				
Passes	1 & 2	1	1	1 & 2
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{1}{8}$	$\frac{1}{8}$
Horizontal				
Passes	1 to 4	1 & 2	1 to 3	1 to 4
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{1}{8}$	$\frac{5}{32}$
Vertical				
Passes	1 & 2	1	1 & 2	1 & 2
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$
Overhead				
Passes	1 & 2	1 to 3	1 to 6	1 to 10
Elect. Diam.	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{5}{32}$

FIG. 14 - Details for welding Inconel clad or nickel clad with 80 pct Ni, 20 pct Cr electrodes.

weld with electrodes of the same composition as the cladding. Details for welding these types of clad materials are shown in figs. 11 and 12.

Because of the high carbon content and the danger of carbide precipitation, types 301 and 302 are seldom used for severely corrosive conditions. However, they are often employed for architectural or decorative purposes where corrosive conditions are not severe. As these applications are generally in the lighter gage materials, it is customary to weld them with 25-20 or 25-12 electrodes throughout their composite thickness.

Types 304 modified and 308 materials are usually welded with a root pass of 25-20 or 25-12, followed by succeeding layers of 19-9 electrodes.

Types 321 and 347 modified cladding materials are welded with columbium bearing electrodes, as titanium is oxidized in the welding arc. The root pass is generally made with a 25-20 Cb or

a 25-12 Cb electrode, followed by layers of 19-9 Cb. Because of the crack sensitivity sometimes found with the 25-20 Cb electrodes, in some cases a root pass of 25-20 is used, followed by the stabilized electrode.

Type 309 material is welded throughout with 25-20 electrodes, as shown in fig. 12.

Type 310 cladding material, in light cladding thickness, is welded throughout with 25-20 electrodes. Because of dilution, half the thickness of the root bead must be ground off before succeeding layers are welded. See fig. 12 for welding details.

The conclusion of this article, dealing with the welding of steels clad with stainless types 316 modified and 316 stabilized, nickel, Inconel, Monel, and Cupro-Nickel, as well as a discussion of backing strips, types of joints, overlays and heat treatment will be contained in the July 29 issue of THE IRON AGE.

Wartime Heat Treating Developments

FINDINGS of German and American research in the heat treatment of steel and steel alloys over the war years are described in a series of Office of Technical Services reports. Copies of the reports, which are briefly abstracted below,

can be ordered, giving the "PB" identification numbers, from the Office of Technical Services, Department of Commerce, Washington 25, D. C. Where indicated the reports are written in German.

Annealing and Corrosion—Data on the comparative resistance of annealed and embrittled 27 pct chromium-iron alloy in boiling nitric acid are given. PB-62828; microfilm or photostat, \$1.00; 12 p.

Hardness Effects—Temperature gradient tests for determining heat effects on the physical properties of Croloy 27 are described. Temperatures from 380° to 1570° were investigated. PB-62853; microfilm or photostat, \$1.00; 11 p.

Sustained Heating Effects—Hardness test reports on the annealing of identical specimens for 400, 1000 and 1600 hr are given, with the data indicating similar properties regardless of annealing time. PB-62830; microfilm or photostat, \$1.00; 26 p.

Hydrogen Absorption—Influence of hydrogen absorption during annealing on the formation of flakes and on brittleness, effects of cooling speed and the connection between martensitic transformation and flake formation are discussed. PB-64725; in German; microfilm, \$1.00; photostat, \$3.00; 32 p.

Strength Loss—Investigations of cold rolled, deep drawn steel to determine variations in tensile properties with time during annealing operations are described. PB-65051; in German; microfilm or photostat, \$1.00; 11 p.

Thermoelectric Effects—Experiments in which the speed of temperature changes, especially cool-

ing speeds, were determined directly from the thermoelectric voltages produced by temperature differences in the cooling metal are described. PB-65099; in German; microfilm or photostat, \$1.00; 7 p.

Electrical Steel—German manufacturing processes in 11 plants making high grade transformer steels are reported on. Hot rolling, annealing and pickling practices and equipment are described. PB-65673; microfilm, \$3.00; photostat, \$7.00; 105 p.

Temperature Regulation—Equipment used in a German precision instrument factory for measuring and regulating annealing furnace temperatures is described and the tolerances on temperature control in the production of high grade steels are discussed. PB-4600-S-70; in German; microfilm or photostat, \$1.00; 4 p.

Induction Heating—Use of high frequency induction heating for tempering and annealing is discussed and an experimental scale, high frequency converter is described. PB-49265; microfilm, \$1.00; photostat, \$3.00; 34 p.

Wire Scale Removal—Annealing, pickling, washing and liming processes for rolled steel wire are discussed with control of sulfur and carbon in the furnace gases, selection of pickling methods, proper liming and elimination of hydrogen brittleness emphasized. PB-44662; mimeographed, 50¢; 15 p.

Stabilization of Austenitic Stainless Steel

AUSTENITIC 18-8 stainless steels are sometimes susceptible to intergranular embrittlement or corrosion. This type of corrosion is particularly pronounced in some 18-8 steels which have been subjected to moderately elevated temperatures—in the range 700° to 1400°F—and are either simultaneously or subsequently subjected to corrosive conditions. Experience has shown that the susceptibility to embrittlement may be decreased or eliminated, that is, the steels may be stabilized against intergranular embrittlement, by the addition of titanium or columbium, usually in conjunction with a stabilizing heat treatment. A diversity of opinion has existed, however, as to the relative amounts of titanium or columbium necessary for effective stabilization of these steels, the injurious effect of carbon content, and the necessity for stabilizing heat treatments.

Using both experimental and commercial steels made to a base analysis of 18 pct and 10 pct Ni, the effect of variations in carbon content, in the ratios of columbium to carbon and of titanium to carbon, and of different heat treatments, was studied by the National Bureau of Standards.*

* Samuel J. Rosenberg and John H. Darr, "Stabilization of Austenitic Stainless Steel," J. of Res. NBS, RP1878, April 1948.

The test ordinarily used to induce susceptibility to intergranular attack consists of heating the steel for 2 hr at 1200° to 1250°F, followed by exposure for 2 days to a boiling solution consisting of 100 ml H_2SO_4 (sp gr 1.84), 100 g $CuSO_4 \cdot 5H_2O$, and 900 ml distilled water. The specimens are then dropped on a steel plate to note whether they have lost their metallic ring, and are bent 180° over a rod whose diameter is equal to the thickness. The outer fibers are then examined for cracks. Steels which are immune to intergranular embrittlement have an unimpaired metallic ring and show no cracks after bending. Extremely susceptible steels lose their metallic ring completely and crumble on bending. In addition to these tests, all specimens studied were subjected to metallographic examination as well as a measurement of electrical resistivity, since intergranular corrosion increases this property considerably.

As part of the investigation a variety of test conditions, some of them quite severe, were used to study susceptibility to intergranular attack. Specimens were sensitized at temperatures ranging from 840° to 1380°F for periods up to 21 days, followed by exposure to the boiling acidified copper sulfate solution for 14 days. It was found that the most severe sensitizing treatment

was 8 or 21 days at 1020°F. Compared with this, the commonly specified treatment of 2 hr at 1200°F is relatively mild.

Considering the steels which contained no stabilizing elements, the tests showed that all were vulnerable to intergranular attack. Decrease in carbon content, however, decreased the degree of vulnerability.

In the columbium- and titanium-bearing steels, carbon content within the range of 0.06 to 0.13 pct had no influence upon the resistance to intergranular attack except as it influenced the Cb:C or Ti:C ratios. Steels varying in carbon content but having similar ratios of Cb:C or of Ti:C had approximately the same degree of susceptibility to intergranular attack regardless of the total carbon content. The steels showed greater resistance to attack when annealed at 1800°F than when annealed at 1975°F.

Stabilizing heat treatments at 1600°F had a negligible effect upon the resistance to intergranular embrittlement of the columbium-treated steels so that these steels carrying a sufficiently right ratio of Cb:C may be used without giving them a stabilizing heat treatment. However, the performance of the titanium-treated steels carrying the higher ratios of Ti:C was markedly improved by such treatments. When properly treated, substantially complete immunity to intergranular attack may be obtained with a minimum ratio of Cb:C = 10 and Ti:C = 5. For more complete immunity, these ratios should be 12 and 8, respectively.

The type of distribution of the precipitated carbides resulting from the sensitizing treatment was not an infallible indication of the resistance to intergranular embrittlement. Steels in which the carbides were distributed randomly were usually resistant to intergranular attack. However, steels that contained carbides at the grain boundaries, even though these carbides were distributed as a continuous network, either were or were not susceptible to intergranular attack, depending on the time-temperature relationship during sensitization. For example, two specimens of a straight carbon (0.09 pct) austenitic steel, one sensitized 2 hr at 1200°F and the other 2 days at the same temperature, were indistinguishable on examination of their microstructure. Both showed a precipitation of carbides at the grain boundaries and on various slip planes. Their behavior after exposure to the boiling acidified copper sulfate, however, differed radically. The specimen that had been sensitized 2 hr suffered severe intergranular corrosion after 2 days' exposure, while that sensitized for 2 days showed no evidence whatever of intergranular attack even after 14 days.

New Wax Room Techniques

ONE of the very critical phases of producing precision investment castings is the production of the wax pattern. An outstanding example of modern wax injection techniques and equipment is the wax room of the new precision investment casting plant of International Nickel Co., Bayonne, N. J.

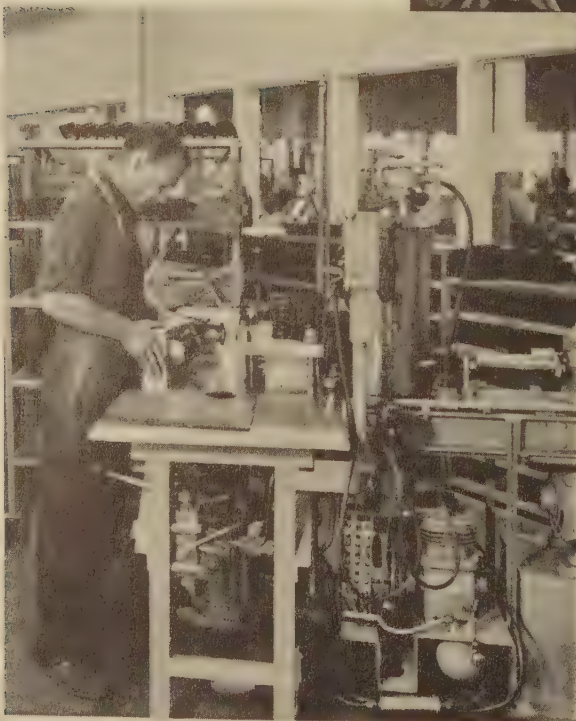
This room is completely air-conditioned and separated by walls from the rest of the shop. A general view of one side of the wax room is shown in fig. 1.

The wax injection units shown in fig. 1 were designed by Inco engineers and feature a refrigerating unit which cools, when necessary, a section of the table forming the lower platen of the clamp. The condensing coils and compressor for this unit are visible in fig. 1.

A closeup view of an injection machine is shown in fig. 2. Wax storage is in the vertical chamber to the rear of the table. Wax temperature is maintained in the storage tank by electric

BELOW

FIG. 1 - View of one side of the air-conditioned wax room of the Bayonne, N.J., precision investment casting plant of International Nickel Co.



ABOVE

FIG. 2 - Closeup of one of the Inco designed wax injection machines.

resistance heaters, thermostatically controlled. All electric controls are centered on the panel to the right. The injection cylinder is positioned horizontally and is controlled by hand valves at knee height, shown below the table. The wax in the storage chamber is constantly agitated by an air-driven stirrer.

The wax molds are positioned in the hydraulic clamp, as shown in fig. 3, for injection. Clamping pressures run up to 20 tons depending on the size of the master mold. The plate immediately beneath the wax mold is cooled by refrigeration, when necessary. The injection nozzle contacts the mold in a horizontal position and pressures of 400 to 800 psi are used to produce the wax patterns.

Sprue assembly and pattern storage is also done in this air-conditioned room.

The new Inco casting shop, one of the newest and most modern plants in the country, specializes in producing nickel base, cobalt base and alloy steel castings in a wide range of compositions.

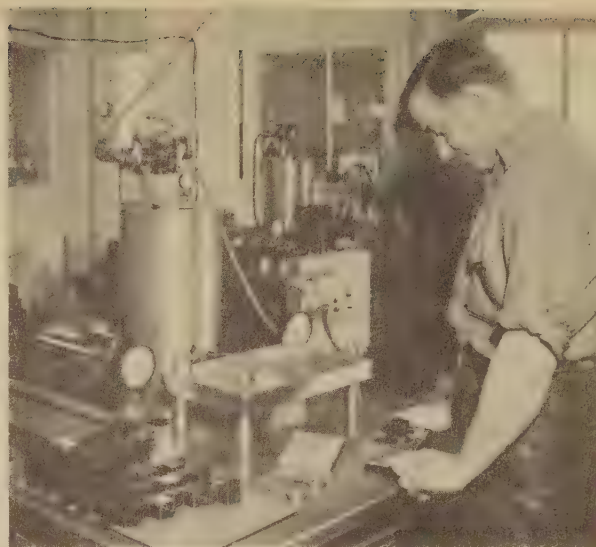


FIG. 3 - The wax mold in the clamping device rests on a refrigerated plate during the wax injection cycle.

Rare Metals Improve Magnesium Alloys

TWO new alloys of magnesium in the form of extrusions, forgings and castings, offering high strength, toughness and resistance to creep at high temperatures, have been developed by Dow Chemical Co., Midland, Mich. Small contents of zirconium or cerium are primarily responsible for their improved properties.

Additions of zirconium to magnesium alloys are effective in developing and maintaining a fine grain structure which, according to Dow and other investigators, offers better strength and toughness. The addition of zirconium also makes it possible to hold the iron content to a very low level, thereby improving the resistance of these magnesium alloys to atmospheric corrosion.

Cerium additions to magnesium alloys are effective in improving properties at high temperatures, particularly in the range approaching 600°F. The addition of cerium to magnesium alloys may be expected to extend the working range as much as 300°F above present limits.

An extrusion alloy is offered containing 0.50 Zr (min.), 5.5 Zn, balance Mg. Significant improvements are reported in impact toughness and compressive yield strength without heat treatment, as indicated in table I. Further improvement in these properties is obtained by a simple age hardening treatment. Aging requires holding the alloy for 48 hr at 275°F. If the temperature is raised to 300°F, it is necessary to age for only 24 hr, but there is some sacrifice in property values.

Impact toughness is an outstanding characteristic of this magnesium-zirconium alloy, identified by the ASTM as ZK60. Tests conducted by Dow have established the typical shear strength at 25,000 psi, the bearing strength at 77,000 psi and the bearing yield strength at 55,000 psi.

Like all magnesium alloys the zirconium-containing alloy requires generous radii when bending at room temperatures. A minimum bend radius of 10 times the thickness is recommended.

As the forming temperature is increased, reduction of the bend radius is practicable. At 200°F, it can be reduced to 8; at 500°F, to 2t. Temperatures above that are not recommended, for if heated above 600°F, or if held in the range of 550° to 600°F for longer than ½ hr, marked reductions appear in room temperature properties. ZK60 extrusions have limited weldability.

Several new cerium-containing magnesium alloys in cast or wrought forms are now also obtainable from Dow Chemical Co. The most generally useful, identified as EM51, contains 5 pct Ce, 1.2 pct Mn and is available for cast or wrought applications. A superior cast alloy composition contains 6 pct Ce, balance Mg.

Maximum properties at high temperatures are obtained after the cerium-containing alloys are heat treated. The improved strength of these alloys is appreciable in the temperature range of 500° to 600°F, as compared with that of other magnesium alloys. The most important gain is evident in creep strength at temperatures approaching 600°F. A solution heat treatment for 4 hr at 1050°F is recommended, followed by aging for 16 hr at 400°F.

Magnesium-cerium alloys are readily weldable and have good machinability.

TABLE I		
Properties of Magnesium-Zirconium Alloy ZK60		
	As Extruded	Aged
Tensile strength, psi	49,000	53,000
Tensile yield, psi	38,000	42,000
Compressive yield, psi	34,000	38,000
Elongation, pct	10	8
Standard Charpy impact, ft-lb		
Keyhole notched	4.0	3.0
Plain	35.0	34.0
Charpy impact, cylindrical, circumferential "U" notch, ft-lb		
Notched	4.0	3.5
Plain	13.0	12.0

Permanent Mold

A comprehensive review of current British practice in casting copper base alloys in permanent molds, with particular emphasis on mold material and mold coatings, is presented in this article. The author also covers composition and physical properties of the more commonly used alloys, as well as melting and casting techniques.

UTILIZATION of copper base alloy permanent mold castings by the American electrical, plumbing, railroad, bearing and chemical industries increases yearly as evidenced by the fact that in 1946 these and other manufacturers purchased 26,250,000 lb of permanent molded brass and bronze parts, in 1947, 51,139,000 lb, and this year's consumption promises to top the 1947 figure.¹

As the demands of American industry for permanent molded copper base alloy parts increase, it is interesting to examine current British copper base alloy permanent molding practices and techniques, for England has long demonstrated a recognition of the value of utilizing the permanent molding process (or gravity die casting) as a means of fulfilling the very heavy demands of her industries for a precision type, high strength, corrosion resistant casting with excellent electrical conductivity.

¹ Foundry, May, 1948.

This article is based on a survey made by the author of the practices and techniques of several recognized British leaders in this field of casting.

A host of diversified copper base alloys are successfully produced in permanent molds in the United Kingdom. Each individual permanent mold caster, nevertheless, has his own particular preference. Brasses are, on the whole, preferred to aluminum bronzes.

The Aluminum Bronzes: In England the most universally employed aluminum bronze is the 88/9/3 copper-aluminum-iron alloy which permits the production of castings to the following typical mechanical properties: Proof stress (0.1 pct), 30,000 psi; ultimate tensile strength, 76,000 psi, elongation 40 pct in 2 in.; reduction of area, 38 pct; Izod impact value, 30 ft-lb, and Brinell hardness, 130.

Not all of the experienced permanent mold casters consulted prefer to cast the 88/9/3 alloy in preference to any other. For example, one caster indicated a preference for the 9.5 pct Al, 1.5 pct Fe, balance Cu alloy; another prefers the 87 pct Cu, 10 pct Al, 3 pct Fe alloy. Still another prefers the 90 pct Cu, 10 pct Al alloy as he has found it to have a castability superior to that of the iron containing alloy. This latter caster points out that the iron-free alloy is also cheaper to handle since it does not necessitate the use of a hardener.

Where superior strength and/or hardness are required, the addition of 3 to 6 pct and 2 to 3 pct Mn is made to the 87/10/3 alloy, keeping the Al and Fe contents constant. The use of this alloy for other than relatively simple castings is discouraged as its tensile strength at temperatures near the solidus point is low and considerable contraction cracking is experienced.

In certain instances aluminum bronzes are employed whose aluminum contents exceed 13 pct, with approximately 5 pct Fe and 1 pct or more Mn and/or Ni. Aluminum bronzes of this sort may possess Brinell hardness values of as high as 300 and tensile strength values as high as 80,000 psi. The alloy containing 80 pct Cu, 10 pct Al, 5 pct Ni, and 5 pct Fe successfully produces parts to a tensile strength of 80,000 psi and an elongation of 10 pct in 2 in.

The 90 pct Cu, 10 pct Al binary type aluminum bronze is prone to develop a weak and brittle structure when it is slowly cooled and for this reason is not employed to cast parts with thick sections. The most effective means of countering the undesirable effects of the slow cooling of this particular alloy is to modify its chemical composition by adding iron. The presence of iron prevents excessive grain growth and engenders a fine grain structure even in cases where the

Casting of Copper Base Alloys

By JAMES L. ERICKSON
Dayton

alloy is slowly cooled.

It cannot be overstressed that alloy choice by the British is based on a consideration of the casting size, weight and design.

Other aluminum bronzes in use, in addition to those mentioned, are the 90/0/1 and the 90/10/1 type. The latter alloy is especially suited for castings which are subsequently heat treated in order to secure high strength. The British also frequently heat treat castings made of the 88/9/3 alloy in order to increase the yield strength whenever a high yield strength is essential. This heat treatment consists of quenching the castings from 1550 to 1650°F and following this by reheating to about 1100°F, a procedure which may increase the yield strength from the typical value of 28,000 psi to 36,000 psi without decreasing the tensile strength or elongation. Permanent molded castings must be comparatively small and of uniform cross-section, however, in order to lend themselves to such heat treatment.

Table I lists the common aluminum bronzes currently permanent mold cast in England.

The Brasses: Table II lists the common British copper-zinc base permanent mold casting alloys

and their composition and mechanical properties.

Opinions differ amongst the British casters as to which brass is preferable; certain of the brasses are easier to cast and/or have less destructive an effect on the surface of the die. H. K. Barton, outstanding British casting authority, states that all the alpha-beta brasses can be cast successfully in permanent molds, and that therefore choice is always predicated on application rather than on castability.

Casting Temperatures

There exists an optimum temperature range for each of the brasses and bronzes. These ranges vary in latitude depending upon the particular alloy. Table III indicates the temperature range which some of the British permanent molders have found to give the most satisfactory results. It should be noted that the magnitude of the range varies from alloy to alloy.

While it would be folly to state that any particular temperature within given temperature ranges is the most desirable, the majority of the British permanent molders do consider the casting temperature critical once it has been ascertained by trial and error. Indeed, some of the

TABLE I
ALUMINUM BRONZE
(Permanent Mold Cast)

Composition, pct					Yield Point, Psi	Proof Stress (0.015 pct) Psi	Tensile Strength, Psi	Elong. pct. in 2 in.	Reduction of Area, pct	Izod Impact ft-lb	Brinell Hardness
Cu	Al	Fe	Mn	Ni							
89	10	.....	1	.....	32,000	.....	78,800	25	.....	.....	.....
87	9	.....	2	.....	28,400	.....	66,400	30	.....	.....	.....
88	9	3	.....	.....	31,000	.....	76,000	40	36	25	135
85	10	.....	.....	5	.....	49,600	72,400	2	5	.....	185
84	10	3	3	.....	.....	28,400	88,200	11	17	.....	159
79	9	6	.....	6	.....	36,400	78,400	15	21	.....	.....
77	10	3	5	5	.....	88,000	100,200	1	2	.....	247

TABLE II

Typical Composition of Basic Cu-base Permanent Mold Alloys

Alloy No.	Cu	Al	Pb	Sn	Mn	Si	Yield, psi	Tensile, psi	Elong., pct	Brinell
1	50	.....	.....	.....	.....	.....	12000	17500	1	108
2	51	.....	.....	.....	.....	.....	14400	54000	19	108
3	53	.....	.....	.....	.....	.....	18000	60000	24	108
4	59	.....	.....	.....	.....	.....	17500	50000	45	90
5	56	.....	.....	.....	.....	.....	20000	65000	21	107
6	62	.....	.....	.....	.....	.....	16500	50000	55	76
7	59	1	.....	.....	.....	.....	30000	65000	30	114
8	60	3	.....	.....	.....	.....	45000	85000	18	160
9	58	2	2	.....	.....	.....	36000	70000	12	.....
10	58	1	.....	1	2	.....	30000	65000	10	120
11	65	.....	.....	.....	.....	1	35000	68000	25	120

Balance in all cases is Zn. Constituents for which no percentage is given should be maintained at less than 0.25 pct. The straight brasses, Nos. 1 to 6, should be extrusion quality.

Pb, Sn, Mn and Fe, where present separately or in association, should be maintained ± 0.5 pct of the figure given. Wider fluctuations result in corresponding instability of mechanical properties. Excess iron appears to affect castability adversely in each of the alloys unless neutralized with excess tin—even so, it is not good practice to add tin for this purpose. Antimony has the most deleterious effect upon alpha-beta brasses and should be kept below 0.002 pct. Its most pronounced effect is upon the impact strength of the alloy (it may reduce it by 75 pct).

British casters take great pains to maintain their casting temperatures $\pm 16^\circ\text{F}$ of the optimum temperature. In practice this optimum casting temperature is the lowest temperature at which a correctly gated and risered die will fill. If this optimum temperature is exceeded, in the case of the copper-zinc type alloys, by as few as 16°F , the tensile strength of the castings may be reduced by as much as 4000 psi and the elongation decreased to only one-third of its desired value.

Extreme care is exercised in the handling, processing, and casting of the copper base alloys by British permanent mold casters. Collectively the cautions and recommendations of the individual casters are:

(1) Do not employ raw materials of low purity.

(2)* Do not retain the casting alloys in the molten state for long periods. They tend to absorb gases which are subsequently liberated on solidification to form unwanted porosity.

(3) Deoxidize the copper, in the case of preparing aluminum bronze, prior to the addition of the aluminum.

(4) Avoid agitating the melt during melting so as to minimize the formation of oxides.

(5) Avoid turbulence conditions when pouring, as the development of oxides which form around each splash or globule of molten metal prevents fusion with the main stream thus engendering cold shuts, folds and seams.

² Analysis of B.S.S.786 runs 3.3 to 3.5 C, 1.6 to 2.2 Si, 0.8 to 1.2 Mn, 0.15 max P, 2.0 to 2.5 Zn, 0.4 to 0.6 Cr, 0.7 to 0.9 Mo, remainder Fe. KE.965 composition is 0.4 C, 2.5 W, 13.0 Cr, 1.5 Si, 0.64 Mn, 13.0 Ni, remainder Fe. Nimonic (80) composition is 70 to 75 Ni, 20 Cr, 3 to 5 Fe, 3 Al, and 1 to 2 Ti.

³ SS38 is an alloy of Stavanger Electro Staalverk A/S, Jörpeland pr. Stavanger, Norway. VH300 is an alloy of Wickmannhytte Bruks A/B, Sweden. The Phoenix NSW and the Styria WPS, as well as the Norwegian SS38 and the Swedish VH300, all run about 8 Ni, 3.5 Cr, 0.3 V, and 0.3 C.

(6)* Use adequate feeding heads and risers to combat high shrinkage.

British casters make it a rule never to hold their melts for long periods at elevated temperatures due to the fact that undesirable oxides are formed and contaminate the melt; 4 to 5 hr per melt is satisfactory. Production operations are designed to avoid too long a retention of the melt by employing dual furnace arrangements; one furnace for general melting, alloying, refining, etc., feeds several smaller holding furnaces.

TABLE III

Alloy	Casting Range, $^\circ\text{F}$
BSS920	1800 to 1870
BSS932	1800 to 1870
DTD412	1990 to 2085
DTD174A	1980 to 2090
Aluminum Bronze	2150, ± 35

Mold Materials and Mold Life: In the choice of mold materials there is a wide diversity of opinion. One English permanent molder uses a good quality heat resisting cast iron, such as Meehanite, to make his main cavity blocks and a good quality nickel steel (the small percentage of nickel is claimed to eliminate scaling) for the construction of cores. This applies to dies for either brass or bronze. He realizes approximately 60,000 pours before the dies fail if the parts are small, and approximately 30,000 pours if the parts are large.

A 3 pct Ni steel is preferred by another caster for die blocks and cores for aluminum bronze; however, he chooses Meehanite for die blocks (nitriding these to 900 Bhn) and mild steel for cores for brass.

A third employs Grade 3, B.S.S.786,² cast iron for dies for either brass or bronze and KE.965² for cores and ejector pins. Recent experiments

by this same plant show Nimonic² steel to give excellent service for cores.

Another uses Norwegian SS38,³ Swedish VH300,³ German Phönix NSW³ and German Styria WPS³ for both die blocks or cores for dies for either brass or bronze. The Norwegian SS38 is preferred, and this is heat treated to approximately 500 Bhn.

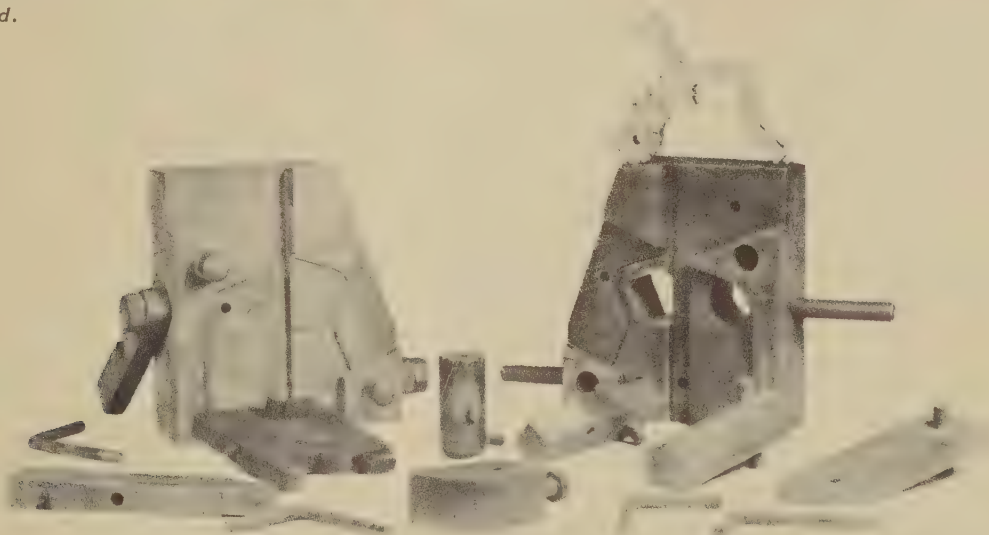
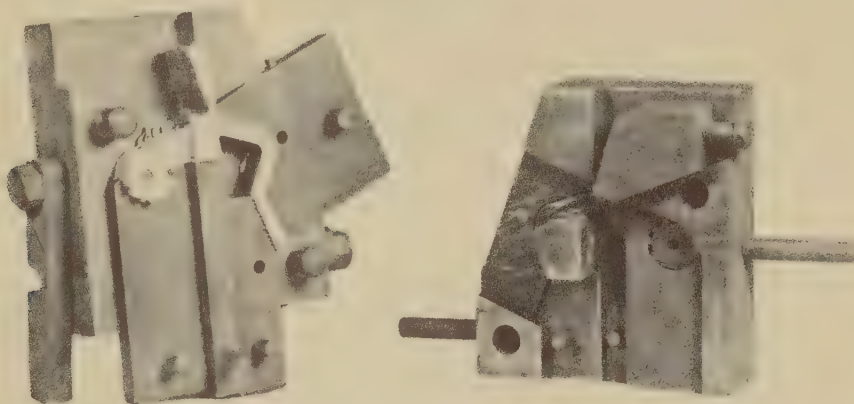
In the case of dies for aluminum bronze, Meehanite E is suitable, according to still another caster, for short run dies (1000 pours or

cores.

The die life, in terms of number of pours, as reported, are astonishing when viewed in the light of some reported American figures.

One English caster realizes an average of 60,000 pours from dies made of Meehanite E before die failure occurs in the case of small parts, and an average of 30,000 pours before failure in the case of larger parts. These results are exceeded by one other contemporary permanent mold caster who claims to realize as many as 30,000 to 80,000 pours from dies made of heat

FIG. 1 - Permanent mold used for producing aluminum bronze parts. Top view shows the completely assembled mold with a casting in the cavity. Lower view shows the mold disassembled. Photo courtesy Metropolitan-Vickers Electrical Co., Ltd.



less); however, the finest grade of hot work steel as employed for pressure die casting copper base alloys is recommended for dies for longer runs. Incidentally, this foundry does not heat treat the W-Cr-V hot work steel as he has found that the high working temperatures involved nullify the effect of the heat treatment.

The same material used to make the main die cavity blocks is frequently used to make large cores; however, the material for constructing smaller cores is usually different from that employed to make the remainder of the die, viz., one caster prefers a 0.28 pct C, 0.20 pct Cr, 9.50 pct W, 0.30 pct V type steel for making cores. Another recommends the familiar 14 pct W type hot work steel. KE 965 is used by the previously mentioned permanent molder to make all loose

resistant cast iron before heat checking becomes serious.

Another caster reports that when using dies made of SS38 steel, heat checking does not occur before 10,000 to 40,000 pours depending upon the design and size of the part.

Not all British permanent mold foundries reported as high results. One caster employing Meehanite dies experiences heat checking before 2000 to 10,000 pours. Occasionally the occurrence of heat checking as early as the 800th pour takes place, with severe heat checking developing by the 10,000 to 20,000 pour.

Only 2000 to 5000 pours can be made in the 3 pct Ni type steel dies and the Meehanite type dies employed by still another English caster before heat checking occurs, and 7000 to 10,000

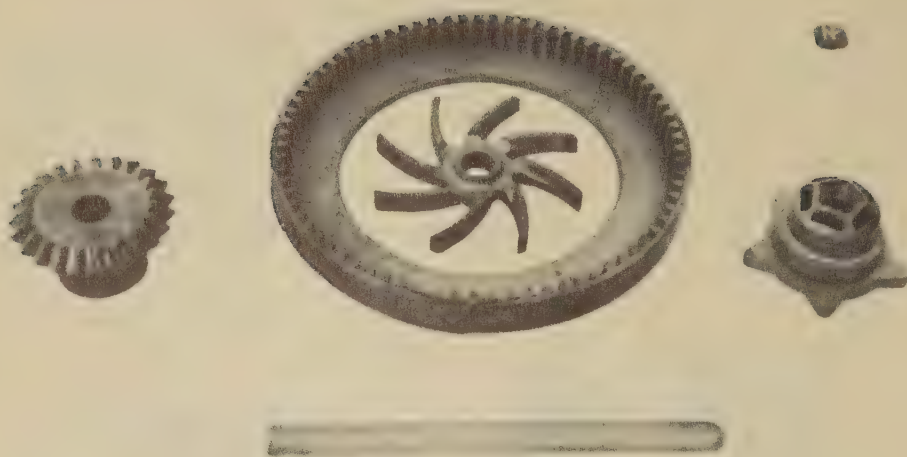


FIG. 2 - Some typical aluminum bronze plumbing parts produced in Britain in permanent molds. Photo courtesy Non-Ferrous Die Casting Co.

pours before heat checking becomes severe.

The caster who employs the Grade 3 B.S.S.786 cast iron experiences heat checking after 7000 pours for small castings and after only 5000 pours for larger castings. Die failure occurs between 7000 to 10,000 pours.

As one prominent permanent molder phrases it: "Actually it is very difficult to give a specific die-life figure as the occurrence of heat checking is dependent upon die design, casting design, die operations, die coating, temperature control and the particular alloy used. All of these affect the commencement of heat checking. In the case of the higher melting-point alloys heat checking occurs almost immediately in the runner but prudent gating can delay and even prevent severe heat checking of the actual impression cavity." This sagacious observation actually accounts for the fact that not all English, or for that matter American, permanent mold casters experience the same results when it comes to die life.

Die Coatings: Probably the most important single operation performed by the copper base alloy permanent molder is the coating of the mold surface and maintaining this coating once applied. It is certainly the most shrouded in mystery! The reason for this is obvious when one realizes that a properly applied die coat is essential to the casting of the copper base alloys and that it can spell the difference between a die that lasts only 20,000 pours and one that lasts 40,000 pours, all other factors being equal. Die coats properly made and applied make possible the economic use of inexpensive die material, viz., heat resistant cast iron, as opposed to the more expensive hot work type steels.

H. K. Barton states that excellent results are to be obtained, when using Meehanite dies, from the use of die coatings based on a suspension of China clay in an aqueous solution of sodium silicate prepared and applied as follows: Sand blast (or vapor blast) the die cavity with silica dust, then heat the die to 360°F and spray on a dilute suspension of China clay and asbestos flour (mixed 1:1) in a sodium silicate water solution

heated to 120 to 140°F. On completion of spraying, the die should be heated slowly to 1000 to 1100°F, then cooled in air to 250 to 350°F. Finally the coating must be polished with a cotton buff on a flexible shaft. This procedure gives the *permanent* type of die coating as opposed to a renewable coating applied as required. One variety of this latter type of die coating may be given the die by smoking it with an acetylene flare until a thickness of from 0.005 to 0.012 in. has been applied, the exact thickness depending upon the weight of the casting. It must be evenly applied and not used to control heat transference. For, in Barton's opinion, the best control of heat transference is achieved by varying the thickness of the die wall and insulating at the back of the die where necessary.

Another authoritative source employs a renewable graphic lubricant in the following fashion: Graphite is kept in suspension in a water filled receptacle by means of turbulence created by an air jet of about 4 psi which is fed into the bottom of the receptacle. The solution is prepared by adding 25 lb of graphite to 50 gal of water. The individual die blocks are dipped into this solution after each pour; the coating thus formed assists in the running of the casting alloy. "Not only is the die coated by this dipping," the caster points out, "but, the die components are cooled. Two necessary operations are performed at once."

To achieve the same end result, one English caster merely makes a paste of graphite and concentrated sodium-silicate which he dilutes with water to any desired consistency. Die components are dipped once every 10 pours. It is interesting to note that the caster who employs the agitated solution and dips after every pour realizes longer die life.

Still another caster uses a mixture of pulverized chalk and distilled water and sprays this onto the die (die temperature: 300°F) in uneven layers according to the character of the casting and the maximum and minimum insulation desired at various points on the die face.

When too much graphite is used to prepare

die coats for casting the brasses, the coating tends to flake off. When too little graphite is used the coating tends to be washed off by the molten alloy.

In Great Britain a number of proprietary preparations are currently marketed. These make use of organic binders and adhesives which give a constant degree of roughness whatever the temperature of the die when they are applied, whereas when sodium silicate is the adhesive, the degree of roughness is dependent upon the temperature of the die when dipped or sprayed, higher temperatures promoting rougher coats.

The plunging of the die parts into a liquid die coat precipitates the greater part of the zinc-oxide adhering to the die cavity and at the same time cools and coats the die.

The object of the die coating, according to the majority of English casters, is to insulate the die from the casting metal in varying degrees in order to arrive at the desired rate of cooling. The degree of thickness of the die coat is governed entirely by the cross section of the casting, that is, a thin section requires a heavier die coating. The die coat also improves the running of the metal within the die. A suitable die coat for aluminum bronze is a mixture of asbestos powder and a water solution of sodium silicate in the ratio of 2 lb of chalk, 8 oz of dry sodium silicate, and 2 gal of water. The thickness of this die coat on application is governed by the temperature of the die at the time the coating is applied, the higher the temperature the thicker the coating.

Dies are always heated externally before the day's production run. Rapid freezing is undesirable because it tends to promote shrink and blow holes in the castings. Dies are never water cooled—on this score there is almost complete agreement among all members of the industry. The use of internal water cooling is a potent means of reducing die life as it causes an undesirable widening of the gap between the temperatures of the die and the casting alloy.

Certain of the British casters resort to designing their molds in such a fashion that the operating temperature heat input is balanced by the heat output, provided the pouring temperature and the casting cycle timing are held constant. Wall thickness of the die is varied or provided with fins of constant height, and where necessary, fitted with a sheet steel back plate

behind which air is circulated from a fan.

In general, dies are designed with two sets of cores. Some dies have three sets, which are numbered and used in rotation. Under severe conditions, use is made of a metal box through which cool air is blown and which has nesting holes in the top into which the cores are placed with their hot ends exposed to the air stream. Sometimes copper centered cores with internal fins are used and air cooled. Usually, however, cores are cooled by being dipped into a weak solution of water and graphite after each pour.

An English expert who secures excellent die life declares that the best way to control die temperature is to avoid any attempts at pyrometric control, water cooling, oil cooling, air jets, copper cores, and fins, as these, he claims, merely tend to complicate the casting operation, weaken the die, and slow down production. He prefers to train his casting operators well, use dies of simple design and solid construction, operate at high speed, dip all cores after each pour, and use duplicate core sets—alternating one set after the other.

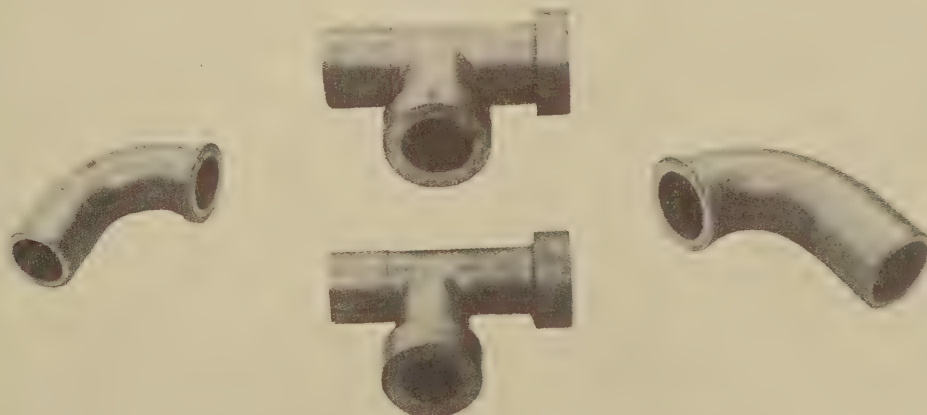
Dies for brass are operated at about 350°F and for aluminum bronze at 375°F. These temperatures are controlled to $\pm 10^\circ\text{F}$. Only one English permanent molder reported that he believes close die temperature control is unimportant.

It is essential to have the dies heated uniformly throughout the cross section to the desired operating temperature before using. To accomplish this, the British casters heat their dies in ovens prior to use. This insures that the dies are not just hot on the surfaces. When dies are not heated uniformly throughout the section, they tend to heat check at a fewer number of pours than do improperly heated dies.

Highly polished dies are never required because the metal is not sufficiently viscous to reproduce machine marks in the ultimate castings. Undesirable oxide build-up on the die face is removed by vapor blasting.

The author is indebted to the following for their assistance in collecting the data and photographs presented in this article: H. K. Barton, England; G. C. Prall, Non-Ferrous Die Casting Co., England; Erik Bejerre, Ulrich's Metalstoberi, Denmark; C. R. D. Brown, Scottish Precision Castings Ltd., England, Arthur Street, Fry's Die Casting's Co., England; and A. Phillip, Metropolitan-Vickers Electrical Co., Ltd., England.

FIG. 3 - Brass dairy fittings cast in permanent molds. Photo courtesy Non-Ferrous Die Casting Co.



Radiographic Practice at Ford

○ ○ ○
By DAVID GOODMAN
*General Electric X-Ray Corp.,
Milwaukee*
○ ○ ○

INDUSTRIAL X ray is being used at the Ford Motor Co., Dearborn, to test materials and methods, to check new processes and for the inspection of regular parts.

Three principal sections, using radiography, have been established: (1) A production section with a 400-kv and a 140-kv unit to do the routine inspection work; (2) an experimental group using a 1000-kv and a 140-kv machine to investigate new processes and inspect locally-used equipment; and (3) an applied physics section which employs four X-ray diffraction units and a portable 100-kv machine for research purposes.

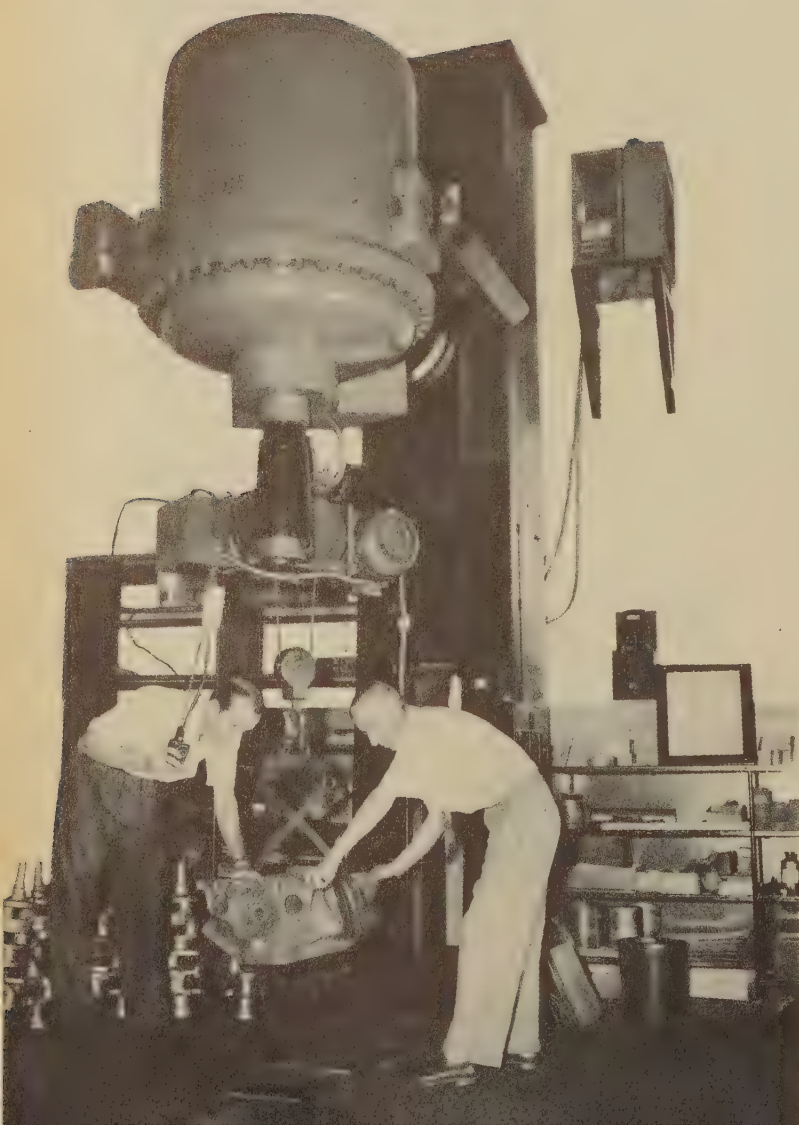
Part of the production group's program is 100 pct inspection of cast exhaust valve seat inserts made of a tungsten-molybdenum alloy. Because of their importance in the tractors in which they are used, these inserts are not permitted to have so much as a pinhole.

With the 400-kv unit, 200 inserts are examined per exposure by backing the unit far enough away to take all 200 at once and by using power sufficient to penetrate the alloy in which $\frac{1}{4}$ -in. thickness is equivalent in radiopacity to $\frac{3}{4}$ -in. standard boiler plate.

An outside foundry producing steering sectors for Ford tractors recently turned out 15,000 parts without qualification by X ray. Upon machining, a large percentage of the first 100 cast-

○ ○ ○

Experimental cylinder block being positioned under 1000-kv X-ray machine for examination.



The X-ray techniques used for inspection, process development, applied physics research and other purposes at the Ford Motor Co. are described in this article. The success of radiography in reduction of costs — one crankshaft production job is estimated to have saved the company \$250,000 per year—and the uses of X ray and electron diffraction in studying surface stresses are also described.

ings had to be scrapped because of major defects found. To avoid the loss of time and expense in machining defective castings, all these sectors were X-rayed and, as a result, 70 pct were found unusable and rejected. The flaws were centerline shrink, gas porosity and blowholes, with the defects generally being located at the root of the gear teeth as shown in fig. 1.

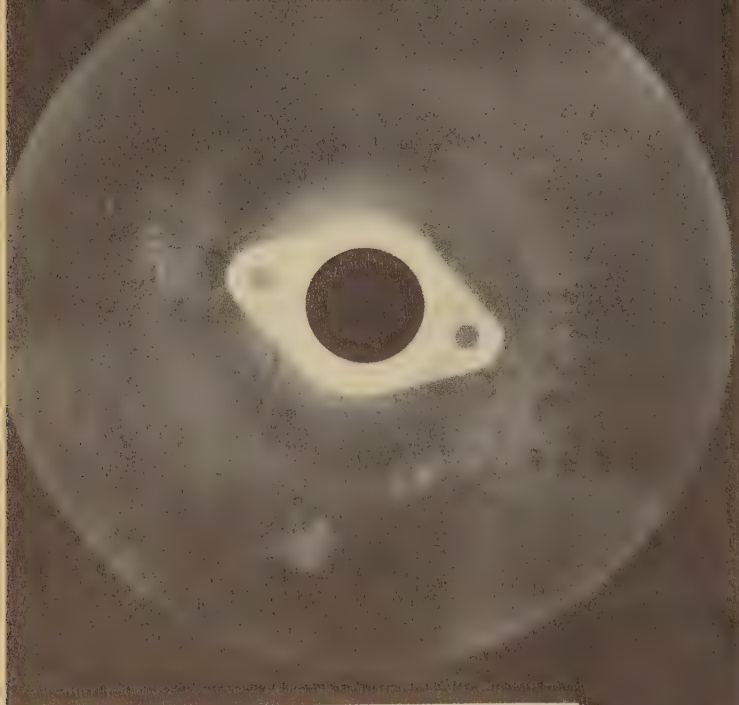
Some unusual setups were used to cut the time required for this job. At first, 84 sectors were arranged in a 10-ft circle with the 1000-kv X-ray unit set at 8 ft and using a 0.005 in. lead film filter. Exposure was for 3 min at 1 milliampere.

It was later found that 24 sectors constituted a more economical setup, providing more continuous operation of equipment by eliminating accumulation of exposed film at the darkroom.

The experimental section, in addition to checking new processes, inspects critical equipment used throughout the plant. For example, a cable control casting for a 15-ton bucket used in handling iron ore broke one day. X-ray examination showed that the casting was grossly defective, containing numerous hot tears and had been certain to fail under severe strain. A replacement was similarly tested and found to contain



FIG. 1 - Tractor steering sectors which were proved defective by X-ray inspection. Centerline shrinkage, gas porosity and blowholes can be seen in the pieces.

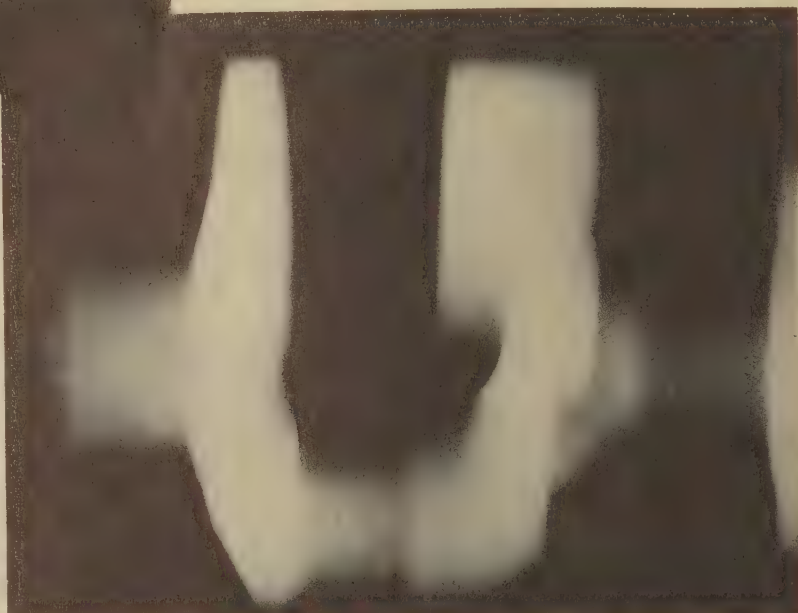


ABOVE

FIG. 2 - Radiograph shows hot tear and microshrinkage in a brass part to be used in an orifice calibration tank.

RIGHT

FIG. 3 - Radiograph of crankshaft reveals lack of fusion at the chill. Such inspection assisted in the development of an improved production process.



serious defects calling for rejection. A second replacement which was accepted after X-ray examination has justified inspection expense by giving trouble-free service.

Similarly a bronze milling machine gear failed and X-ray examination indicated that an entirely unsuitable type of bronze had been used. Otherwise the defects which made the part unsuitable for use would have been revealed only on machining. Several replacements were ordered, made of a more suitable alloy, from which castings were selected by X ray. Parts so checked subsequently have given no trouble in the highly-stressed milling machines.

The plant is now X-raying the peels used in charging the openhearth furnace. X-raying these is a job of considerable proportions requiring the use of a 1000-kv unit, as each peel is a huge cast cylinder 20 ft in length and weighing about six tons.

Another example of inspection of locally-used parts is the brass orifice calibration tanks for carburetor flow benches. The units are operated on high vacuum and imperfect parts would be

subject to leakage and stress. Since the tank requires a satin finish, many hours of machining time may be saved if it is examined radiographically prior to the machining. The part shown in fig. 2 was found to contain a hot tear and microshrinkage, indicating poor casting technique and a poor alloy.

As a safety measure, a program of X-raying all pressure tanks, such as propane cylinders, is underway. To inspect cylinders the reflected beam emanating from the side rather than from the end port of the million volt X-ray cone is employed, as the softer radiation from this port provides higher contrast and greater sensitivity for thin-walled objects. An added advantage in using the million volt unit is that fewer films are required to examine the circumferential weld due to the distance, approximately 15 ft, from X-ray tube to film.

Welders' torches are also X-rayed by the experimental section and even X-ray tubes themselves have been examined to determine the condition of the target after prolonged use.

An outstanding example of the contribution of radiography to the improvement of production processes resulted when examination of one type of crankshaft showed lack of fusion at the chill, fig. 3, and pointed the way to improved techniques resulting in a saving conservatively estimated by the company to be \$250,000 on a year's production.

In this instance, X ray showed that use of chills in the main bearings resulted in lack of fusion, in blows off the chill and in a considerable breakage of drills directly attributable to the use of the chills. Experiments directed to the elimination of the chills were guided by X-ray examination of the castings to a final practical solution in which four bottom chill plates of 4x4x $\frac{3}{4}$ -in. size, mounted on the bottom of the conveyer hangers, gave the desired directional solidification and permitted the complete elimination of chills.

The savings effected included the cost of the chills themselves, cost of the labor of placing the pieces in position, extra drilling time needed to drill through the steel chills as compared with the crankshaft metal, and reduction in breakage of drills and all the attendant waste of time and material.

A similar crankshaft production problem uncovered by X ray, fig. 4, led to use of a different gating position and production of sounder parts.

X-Ray Diffraction

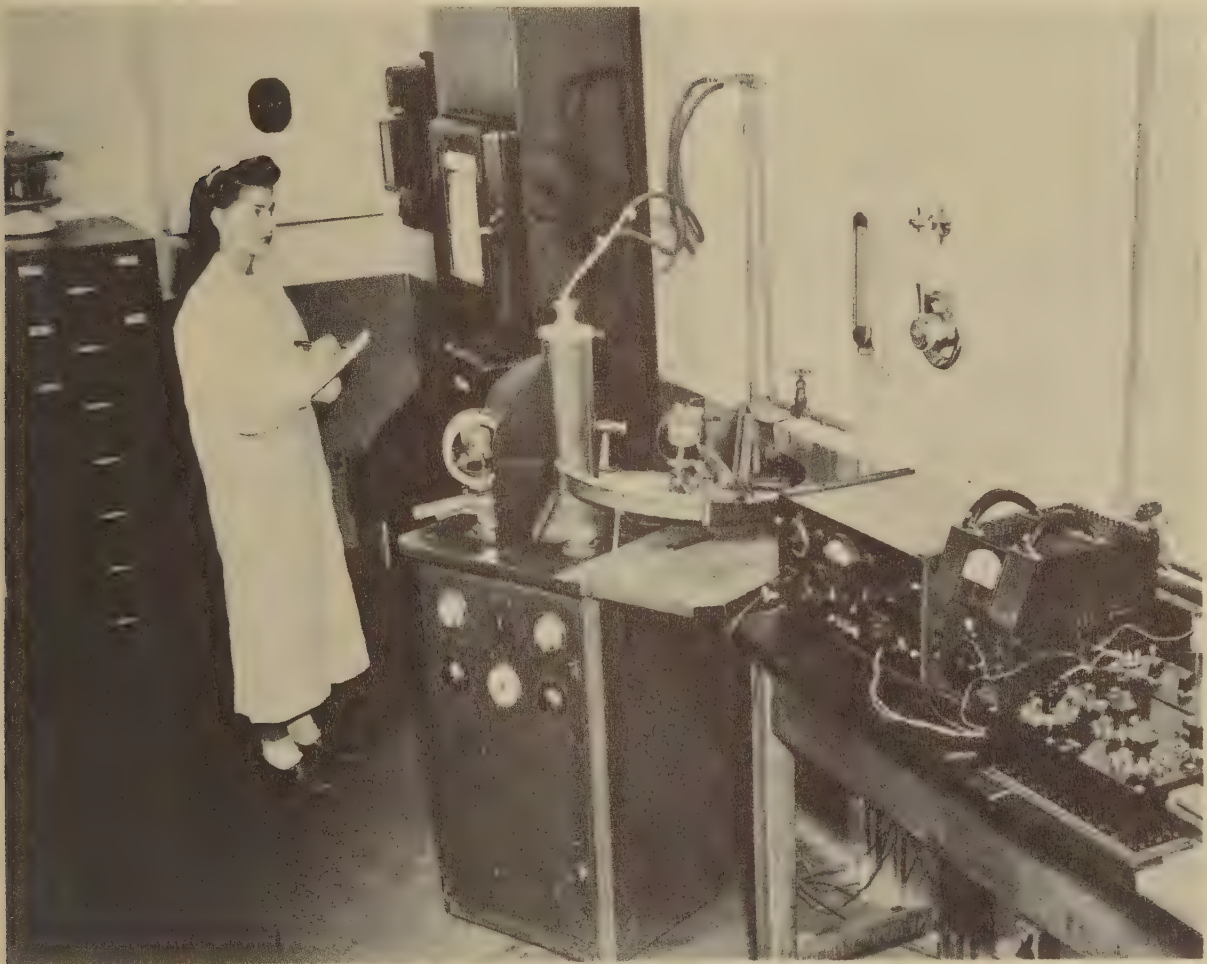
Diffraction is an indispensable tool of the Applied Physics Research Section at Ford. Of the four units utilized in this group, one is being used, minus camera, as a special Geiger-Mueller counter, frequency meter diffraction recorder to give a continuous record on chart paper of the X-ray diffraction intensities ordinarily recorded

on photographic film.

This method is expected to offer considerable advantage in measuring surface stresses in industrial work. Experiments with the device, shown in fig. 5, demonstrate that it is faster than camera-film diffraction and eliminates the need for correlating film densities with actual X-ray intensities.

The most useful heat and corrosion resistant alloys for use in internal combustion engines are austenitic, this austenitic phase being developed by extensive use of expensive alloys. In research leading to the development of less costly compositions, trends in development of this austenitic condition can be followed by X-ray diffraction as at least a partial substitute for time-consuming exposure tests.

In another application, diffraction helps study the extent and period of stress in nonaccessible areas of crankshaft fillets where fatigue is both



ABOVE

FIG. 5 - Special Geiger-Mueller counter frequency meter diffraction recorder provides a continuous chart of X-ray diffraction intensities. The unit gives results faster than standard machines in which intensities are recorded on photographic film.

RIGHT

FIG. 4 - Gating this crankshaft at the cheek instead of at the No. 2 pin eliminated the shrinkage shown in the radiograph.

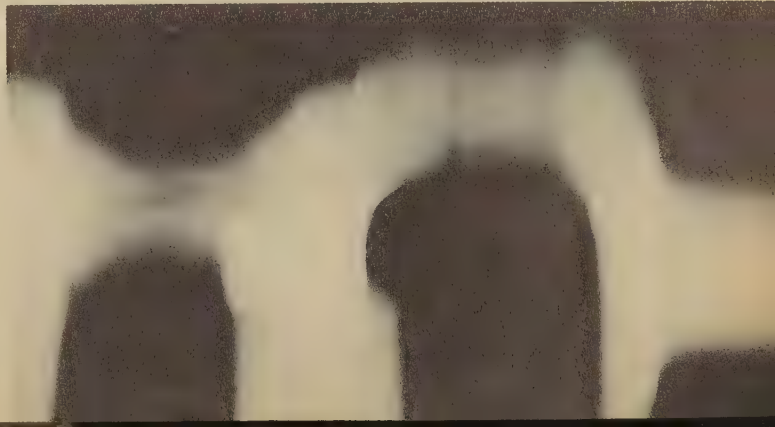




FIG. 6 - X-ray diffraction unit positioned to study extent and period of stress in non-accessible areas of crankshaft fillets.

likely and dangerous. A crankshaft is shown positioned for inspection in fig. 6.

Diffraction is being used to study and correlate industrial variables in the shot peening of springs and other parts used in heavy duty service in buses and trucks, as whenever structural parts subject to fatigue failure can be manufactured with a compressive stress in the surface layers, it has been found that the fatigue life increases tremendously.

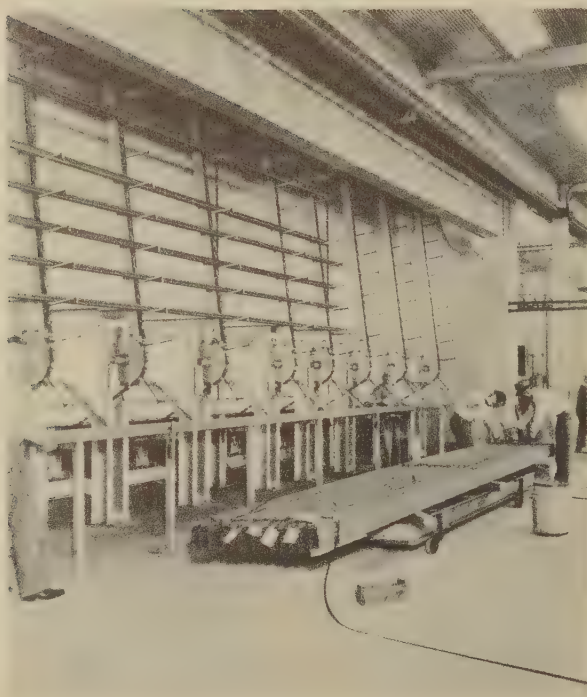
The department is also called on to study samples of abrasive papers for grain size and uniformity.

When the 90-in. continuous cold strip mill for deep drawing automotive body steel was introduced in the factory, the research department was able to work out a correlation between the diffraction and metallographic patterns and the Olson ductility test for rupture.

One of the special tools employed by the research group is electron diffraction. A custom-built unit provides patterns from very thin layers and is of particular value in studying surface films such as those employed in corrosion protection.

Studies with this machine showed interesting differences in the oxide films present on different samples of aluminum sheet, and since difficulties in welding one sheet of aluminum, as compared with another, have been traceable to differences in these oxide films, the method will be used for following the processes designed to develop the most readily weldable surfaces on aluminum sheet.

Vertical System Gives Drying Process Savings



A VERTICAL conveyor system which carries work to be baked or dried through a gas fired, tower type oven has saved floor space and proved efficient in drying the rust proofing paint on straight structural steel sections.

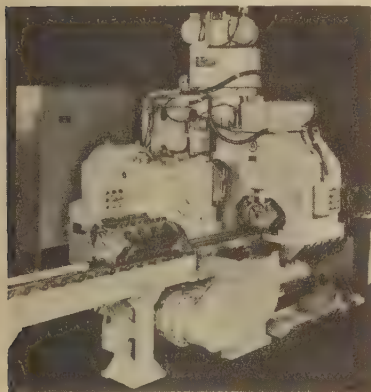
The installation, shown in the accompanying illustration, was developed by Ace Conveyor Industries, Inc., Detroit. Structural shapes, after being dipped in red lead paint for rust inhibition, are carried from the dipping room on a roller conveying system. From this they are automatically kicked off onto an entry conveyor which in turn is synchronized with the vertical oven conveyor so that as the pieces move forward they are picked up by the extended pins of the oven conveyor chain. The pieces are then carried up one side of the tower into the oven, go through the established baking cycle, are turned over at the top and carried down the other side. The extended pins on the nine strands of the conveyor chain handle the work through all the operations in the tower. Efficiency of the oven is reportedly good since the only openings are at the bottom.

New Production Ideas . . .

Special automotive transmission and cylinder block machines, spot welding presses, induction motors, sheet metal slitters, compressors, laboratory kilns, and equipment for electroplating are described in this issue. Also a new frequency counter, a transformer relay, a core machine, and a new carburizing salt are listed.

Cylinder Block Miller

AUTOMATIC milling on both ends and the main bearing faces of an automotive cylinder block with a single clamping of the work is the design feature of the special Rigidmil built by *Sundstrand Machine Tool Co.*, Rockford, Ill. Machining has been combined into one operation to reduce handling time and to machine ends and bearing faces accurately in relation to each other. Two 15-hp horizontal, single spindle heads have transverse feed on slide-ways at both

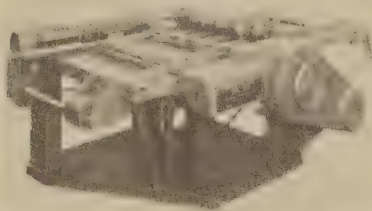


ends of a rise and fall fixture to face-mill ends of the block. A 7½-hp head mounted in the machine base drives an arbor with cutters for straddle-milling the main bearings. The conveyor fed block enters the loading position on a hydraulically operated shuttle. In an automatic push-button operated cycle, the block is shuttled into the rise and fall fixture where it is hydraulically clamped. The two opposed horizontal heads feed simultaneously to face mill both ends of the block. At end of the stroke, the cutters retract and heads rapidly return. The fixture then feeds downward for the straddle-mill op-

eration on the main bearing faces. When completed, the fixture rises, releasing clamping pressure and ending the cycle.

Slitter

A DUPLEX body blank slitter, announced by *Lima-Hamilton Corp.*, 60 East 42nd St., New York 17, is a 36-in. machine designed for plain iron or tin sheets having a maximum thickness of approximately 0.017 in. Operating speed of the machine is 50 sheets per min or slower. Cutters supplied with these heavy duty machines are high-carbon, high chrome forged steel. The slitter will trim and slit sheets up

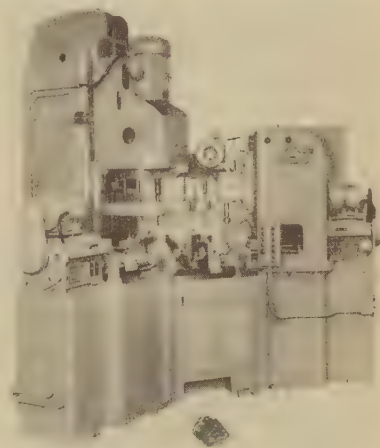


to 36 in. sq into strips on the first unit, and then automatically trim and slit the strips into body blanks on the second. For cap stock and for blanking bodies of large size cans, the same basic machine, with a different feed arrangement, will trim sheets on the first unit, and trim or trim and slit them on the second. The slitter can be arranged for plain material or lithographed sheets, and can be hand-fed or operated in conjunction with an automatic sheet feeder. A 3-hp motor drive unit on the slitter is controlled by start-stop and jog buttons.

Combination Drilling Machine

FOR drilling, spotfacing, reaming, countersinking and tapping seven holes in approximately

138 automotive transmission rear bearing retainers per hour, *Le Maire Tool & Mfg. Co.*, 2657 S. Telegraph Rd., Dearborn, Mich., has designed a machine which combines three different types of units to provide the most desirable type of unit for each operation. This combination consists of a vertical machine, slide-type drilling unit to provide wide support for the 4-spindle head, two small horizontal twin ram quill type drilling units with single spindles, and a small



vertical lead screw tapping unit with single spindle. These are mounted on a steel frame and are grouped around a 33-in. diam 6-position automatic indexing table having hydraulic indexing mechanism. The table carries six quick-acting fixtures and one part is completed at each cycle of the machine. Coolant is pumped from a tank built into the table base.

Spot Welding Press

DESIGNED to handle large, complicated sections, reduce manual labor, and perform the welding job in one step, spot welding presses available from *Clearing*
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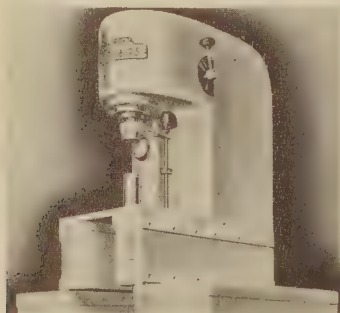
Machine Corp., 6497 W. 65th St., Chicago 38, are built to specifications for individual jobs. Several welds can be made at one time. Actuated by a toggle link mechanism, the platen with four-point suspension moves up to bring the



work to the electrodes. An automatic welding panel is energized when the press reaches the top of the stroke and welding is performed in required sequence with the press closed. A contact on the welding panel then transfers control back to the press control panel, which allows the platen to return to its open position. A geared V-belt drive with air friction clutch is on top of the press.

High Speed Multipress

CHANGES in the control system, in the operating component, and in the power system, resulting in new, high speeds of 1100 ipm approach speed, 450 ipm pressing



speed, and 750 ipm return speed, feature the new Rocket multipress, announced by *Denison Engineering Co.*, 1160 Dublin Rd., Columbus 16, Ohio. The press is a 4-ton capacity machine, suited to high-speed applications, and offering speeds said to be 3 times faster than standard Multipress models, yet retaining all the advantages of Hydraulic power.

Arbor Press

SUITABLE for light to medium pressing operations such as forming, flaring, stamping, crimping and riveting, the Bellows Model BAP-20 arbor press features controlled air power and is designed to operate on any line pressure ranging from 5 to 175 psi. A built-in speed control valve is said to permit infinite variation in the speed of the advance stroke. The press is powered by a 5½-in. bore air cylinder developing a thrust of approximately 20 times the operating air line pressure. Stroke length is adjustable from a fraction of an inch up to 2½ in. maximum. Maximum clearance of the 1¼-in. diam ram shaft is 7 in. The position of the air cylinder is adjustable vertically in steps of 1½ in. Table size of this press, which is made by *Bellows Co.*, Akron, Ohio, is 8x9 in. with a throat clearance from the center of the ram of 5 in.

Induction Motor

A NEW wound-rotor Life-Line induction motor for use where adjustable speed is required or where high starting torque with low-starting current is necessary, is available from *Westinghouse Electric Corp.*, 306 4th Ave., Pittsburgh 30. This motor known as Type CWP, is open drip-proof construction and is made in ratings from 1 to 15 hp. Brushes are made of electro-graphite or metal graphite with sliding box type brush holders having adjustable spring tension. The collector rings are molded solidly into insulation bushing which is pressed on the shaft. Rotor core consists of punchings riveted into a solid structure and held on the shaft by a shrink fit. An oversize fan gives maximum air circulation. Bearings are presealed with special lubricant. Applications include driving compressors, plunger pumps, positive pressure blowers and for bringing heavy loads up to speed.

Axial Flow Compressor

AXIAL flow compressors available 22 in. long between flanges with a case diameter of 17 in. and which deliver 18,000 cu ft at 25-lb gage pressure are said by the manufacturer, *Frederic Flader, Inc.*, 587 Division St., North Tonawanda, N. Y., to use a new principle in industrial compressor design. The compressor is made up

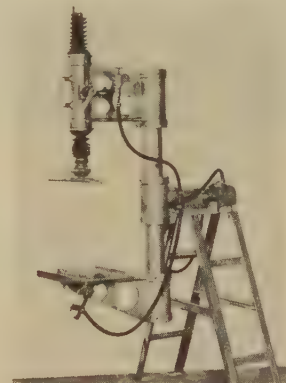
of a rotor mounted at its ends on precision ball and roller bearings. Each rotor carries a plurality of blades in circumferential rows, each row constituting a cascade of airfoils. The OD at the blade tips is usually constant and the rotor surface to which the bases of the blades are fixed is tapered. The design of both rotor and stator



blades is based on modern aerodynamic theory and research tests. Operating efficiencies up to 88 pct are said to have been established and savings up to 20 pct in power consumption can be obtained in larger sizes. Capacities range from 1000 to 300,000 cu ft per min and pressures up to 100 psi can be obtained in a single unit.

Core Machine

A CORE machine which operates on compressed air has been built by *Valley Mfg. Co.*, Cherry Valley, Ill., to draw a core box ranging from 1 to 9 in. deep. Only an air control valve handle and vibrator valve lever are used in operating the machine, and no skill is required of the operator.



The machine is lightweight, cast of 80 pct aluminum, making it easy to roll over.

Sand Dryer

A NEW rotary dryer and screener for sand, limestone or similar inorganic free-flowing material which is claimed to dry

and screen 2 to 3 tons of sand per hr with an initial moisture content of 6 pct, has been announced by *Mines Equipment Co.*, Dept. 32, 4215 Clayton Ave., St. Louis 10. The machine operates on the counter-flow direct heat principle. Maximum thermal efficiency is obtained in the dryer-screener by



passing heat from the combustion chamber directly into its rotating drying cylinder. Heat from exhaust gas is utilized to preheat the hopper containing the incoming wet material. A rotating screener at the discharge end separates coarse from fines, discharging each through a separate opening. The unit is available with low-pressure oil burner and blower, high-pressure oil burner for operation with compressed air, or gas burner with either natural or manufactured gas.

Collet Chuck

A PRECISION collet chuck for rigidly holding large size work pieces has been added to the line of precision collet chucks manufactured by *Erickson Tools Div.*, 2309 Hamilton Ave., Cleveland 14. It accommodates Erickson standard precision collets over a range of 8 to 10 in. in increments of 1/32 in. Gripping the work rigidly over a range of 1/32 in. is thus applied to larger jobs, permitting quick chucking of work for second operations. Since the piece is gripped throughout the length of the collet, wear does not lead to subsequent inaccuracy in holding, it is claimed.

Head Type Punches

CLAIMED to produce more slugs per grind and more slugs per punch, head type punches made by *Porter Precision Products*, Cincinnati 12, are made from precision ground heat-treated tool steel. The first four series are furnished in a minimum length of 1½ in. to allow greater range of application in short shut heights. A companion line of round type retainers fur-

nished in a high-tensile, machinable steel are optional in two sizes. A light press fit on the punch body is said to firmly hold the punch and reduce destructive shattering action.

Laboratory Kiln

A SEMI-MUFFLE laboratory kiln, developed for use where floor space is limited and which is a complete unit with all controls and operating mechanism in a single housing, is announced by *Perry Equipment Co.*, 893 Chambers Rd., Columbus 8, Ohio. Known as the model LB-74, this unit has been designed for extreme flexibility of firing cycle, ranging from drying temperatures up to 2700°F within 2 hr, for continuous operation, and flash firings up to 3000°F. Heat is said to be evenly distributed from eight elements, four over and



four under the chamber, and the kiln is baffled for maximum temperature uniformity. Control is fully automatic with electronically operated indicating and controlling pyrometer. Visual control over current input for identical repeat-firings is provided with pushbutton meter. A circuit breaker cutoff switch protects the kiln from overloading. The unit operates on 230 v, 60 cycle, single-phase ac, 9 kw input at maximum, with variable control from 1.8 to 9 kw.

Punch

A DOUBLE purpose machine developed for rapidly punching holes up to 4 in. diam and for use as a precision punch press for blanking, drawing, embossing and forming operations, has been added to the line of Di-Arco die-less duplicating equipment. Punching action of this machine which is manufactured by *O'Neil-Irwin Mfg.*

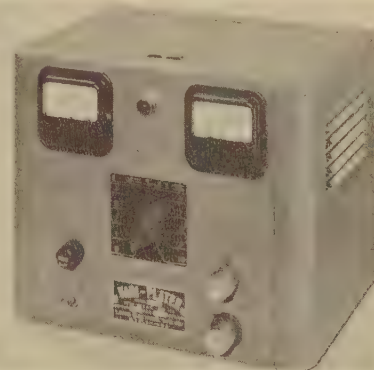
Co., Lake City, Minn., is obtained through a roller bearing cam which is designed to convert pressure exerted by operator into extreme pressure at the point of impact. This punch, marketed primarily for short run operations, is also recommended for production quantities in lightweight materials where a hand operated machine can be employed more effectively than a power unit. A flexible gaging arrangement can be adjusted to provide precision location. Interchangeable punches in round, square, oval and rectangular shapes are available.

Lubricator Valve

A LUBRICATOR valve that delivers a positive metered amount of oil or grease to each bearing in lubricating systems has been announced by *Titeflex, Inc.*, 554 Frelinghuysen Ave., Newark 5, N. J. Known as the Grannan lubricator, it dispenses all lubricants from light oil to heavy greases through the same valve without alteration. It is a fully hydraulic, through flow valve, with no crevices to retard lubrication. The valve, which is completely inclosed, is installed directly into the bearing. It will function with hand operated guns or from an automatic system set to operate at any desired interval. Operating temperature is from 0 to 300°F.

Electroplating Unit

PLATING gold, silver, chromium, nickel, copper, cadmium on metals and non-metals is possible with the selenium rectifier *Vari-Plater* manufactured by *Lewis*



Electrical Mfg. Co., 1943 Walton Ave., New York 53. This Model A-10 is a complete packaged electroplating unit that can be operated immediately upon installation. Its features include variable dc voltage; works in tandem (several

units can be combined to raise voltage or amperage); and instantaneous dc power with no warm-up period required.

Precision Frequency Counter

UTILIZING high speed electronic counters, a system of measuring frequencies with accuracies of one part in ten million or greater has been developed by *Potter Instrument Co. Inc.*, 135-56 Roosevelt Ave., Flushing, N. Y. Measurements can be made without need for calibrating, tuning, zero beating, interpolating or any other exacting procedure. The method is said to be ideal for doppler frequency measurements and similar applications in which only a second or less time is available for making the measurements. Any frequency from 0 to 1.6 megacycle can be measured. The system can be used in laboratories where high precision is required and in various industrial applications for precise measurement and control of shaft and roller speeds. Basic units of the system are two high speed electronic counters, a crystal oscillator and an electronic switch.

Transformer Relay

SAFE loading of power transformers to their full thermal capacity can be automatic with the use of a relay announced by *Westinghouse Electric Corp.*, 306 Fourth Ave., Pittsburgh 30. Actuated by a bimetal mounted in a well in the transformer wall in the top oil zone, the new type Tro relay continuously evaluates the hottest-spot



temperature of the copper windings to operate three snap-action, self-resetting switches. The first switch operates with increase of transformer load to start cooling fans. If the load increases and approaches the safe thermal operating limit, the second switch closes to give a warning. If load continues to increase until the thermal limit is reached, the third switch trips the breaker or gives an alarm.

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Action of the transformer relay is dependent upon the temperature of the top oil, the load carried by the transformer, and the length of time the load has been carried. The thermal relay is designed to protect from overloads of the operational type only and will not function on short circuits unless other protective relays have failed to operate.

Air Cylinder Control

A SYSTEM of air cylinder control, developed by *Numatics*, Milford, Mich., provides individual



control units that are installed directly to cylinder heads. They are simple, full capacity 3-way valves to be screwed directly into the pipe connections of any air cylinder. Control can be at the cylinder or from a remote location using 1/4-in. tubing or hose from the operating station. Speed can also be controlled by throttling at the individual exhausts. It is claimed more work can be performed per cubic foot of air input than can be done with a single unit 4-way valve installation. These units are available in pipe sizes, 1/2, 3/4, and 1 in.

Carburizing Salt

A WATER soluble carburizing salt known as Perliton W, readily removed from oil-quenched parts by immersion in hot water, has been developed by *E. F. Houghton & Co.*, 303 W. Lehigh Ave., Philadelphia 33. The material is recommended for case hardening hard-to-clean parts at temperatures up to 1575°F. As a replacement for straight cyanide, its advantages are said to include reduced time cycles; increased production; harder surface; easy cleaning and cleaner surfaces; less cyanide breakdown; less fuming; and better working conditions for operators. Procedure in using this prod-

uct consists of a starting salt known as Perliton 323 which is used for melting down of bath. Perliton W is used after bath is broken in, and for replenishments to compensate for drag-out losses. Additional advantages are listed as production of a true carbon case; maintenance of carburizing value when drag-out is normal, permitting replenishment with fresh salt retardance of grain growth because of lower temperature operation, which creates less thermal shock and less tendency to warp; salt readily washed off from threads or crevasses, eliminating tumbling or sand blasting.

Polishing Wheel Cement

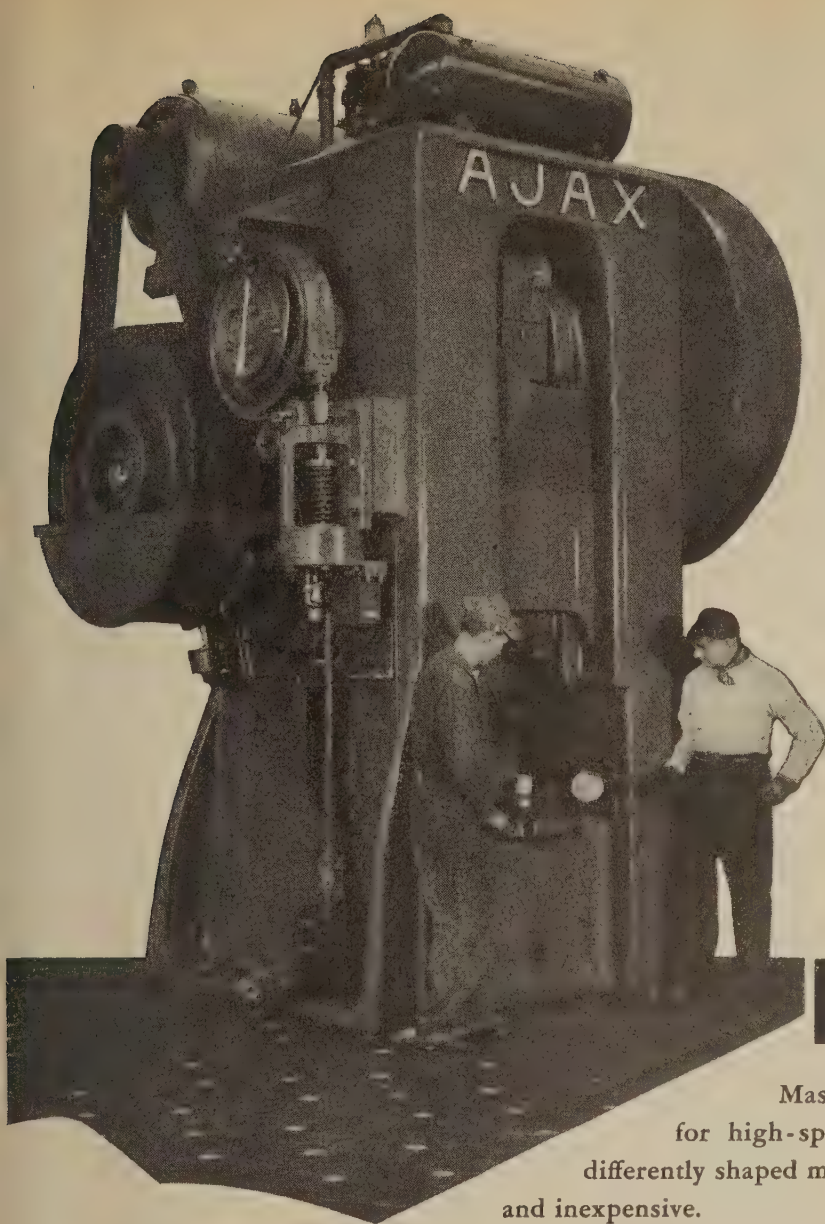
EXTRAORDINARY flexibility, combined with exceptional adhesive strength, are claimed for a new polishing wheel cement called Wheel King, produced by *Wallace A. Erickson & Co.*, 842 N. Wells St., Chicago 10. On a wide range of polishing jobs it is said to produce from 25 to 60 pct more pieces per setup than with hide glue. Successful results are shown with 240 and all coarser grains, including use on grease wheels and abrasive belts. Wheel King is manufactured in one form for use with all grain sizes to 240. It is applied cold.

Side Dump-Trailer Truck

INDUSTRIAL plant jobs such as collecting, hauling and dumping scrap, gravel, metal shavings, borings and similar loads can be performed with a side dump-trailer truck manufactured by *Palmer-*



Shile Co., 16005 Fullerton Ave., Detroit 27. One style has gear type dumping rockers, another style has automatic coupler at rear for train hauling. Dumping is controlled to either right or left side. The truck has a heavy gage reinforced steel body, mounted on structural steel framework. A pull bar is 30 in. long and wheels are 18x3 1/2 in. metal roller bearing type with molded on rubber tires.



**press
forge
vital
parts
for**

INDUSTRY

Mass production in industry created demand for high-speed production of large quantities of differently shaped metal parts that were strong, uniform and inexpensive.

The advent and subsequent development of the Ajax High-speed Forging Press, with its high rate of continuous production of closed impression die forgings, has made forging the most advantageous means of producing a constantly widening range of these accurate, high-strength parts at low cost.

The press forging of vital parts, of simple or intricate design, from a few ounces in weight to a hundred pounds or more, for a multitude of industrial applications is the modern way—geared to straight-line production with correspondingly lowered costs.

Write for Bulletin 75-B.

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• Detroit has a good case of f.o.b. mill jitters . . . Outside steel costs will soon jump appreciably . . . Mr. Reuther shows up at Ford labor negotiations . . . Strike at Ford possible but not likely.



DETROIT—Of all the hot topics in Detroit last week the f.o.b. mill system of selling steel held the spotlight. A canvass of steel buyers revealed that nobody has yet figured out how much the new system will cost them. Many of them declare they still won't know what their costs are after all the different mills announce their new prices. These buyers state that because the different steel items may come from locations over which they have no control, the automobile companies costs can only be figured on a retroactive basis after all the material for a given run is in and used.

Great Lakes Steel announced last week that they too would abandon the defunct basing point price system. Until this steel producer announces just exactly what their new price will be, most Detroit buyers say they won't be able to even estimate how much the move will cost. Great Lakes has more at stake in scrapping the basing point system than have most other steel producers. This may only be true for the moment, because of terrific steel demands, but when f.o.b. mill is installed the arbitrary Detroit

freight rates also will cease to exist.

This means Great Lakes will collect \$4.20, minus actual delivery cost, less on every ton than they did heretofore. To a buyer in this area f.o.b. mill may mean one, two or three line railroad hauls. Many purchasers will go in for trucks, but there is a limit on how many trucks the mill can handle. It certainly didn't cost Great Lakes \$4.20 a ton on the average to lay down their shipments in consumers' plants in this area under the old system. The actual delivery costs subtracted from \$4.20 represents the phantom freight this steel company formerly enjoyed.

Observers here expect that Great Lakes will adjust their f.o.b. mill price by adding all or part of the present arbitrary rates to the old base price. In addition they will then add the new steel price increase but will probably wait until U. S. Steel Corp. sets the pattern. Every way they look at it consumers don't want it, but they now have it for better or for worse.

Not all of the steel used by Detroit's automakers, however, will be drastically affected by f.o.b. methods of selling alone. A large portion of steel tonnages finally reach this area through the complicated conversion route. These tonnages finally reach this area through the complicated conversion route. These tonnages are always f.o.b. plant with consumers not only paying freight on finished goods, but also on all movements of semifinished. Least affected by straight f.o.b. mill selling will be Kaiser-Frazer which receives about 95 pct of their steel via conversion. The new system in selling may actually help Kaiser-Frazer's procurement problem as this change will give K-F another chance to approach the steel producers to talk over the new system. Anytime Kaiser-Frazer gets a chance to talk they usually accomplish something beneficial to their steel needs.

FOR steel reaching here from Pittsburgh consumers can count on an added 25¢ per 100 lb.

From Chicago the increase amounts to 23¢ per 100 lb. This increase in consumer cost per ton of steel represents the difference between the old arbitrary freight rate and the present actual rate. On top of this added cost, of from \$4.60 to \$5.00 a net ton, steel consumers will soon be paying a higher mill price after the U. S. Steel Corp. figures out what steel product price increases are necessary because of higher coal and labor costs.

All told, steel in Detroit purchased from out of district mills will soon cost from \$10.00 to \$13.00 a ton more, and if that doesn't eventually mean even higher automobile prices all precedents will have been broken. Only General Motors, Willys and Crosley are still holding the old price line. These companies are expected to capitulate soon. In addition to the last increase in car prices, the new steel prices will again cause the industry to increase the price of practically all the items they sell, observers here declare.

TOOL and die shops were no closer to settlement in their month-old strike. Negotiations were at a standstill. Some automakers were merely inconvenienced by the strike, while others were acutely affected. GMC, hard at work on plans for new models, has been hurt, as has been Chrysler. The new Cadillac Motor program for the new model car is almost at a standstill. This new engine is a compromise, observers say, of the Kettering type engine. Compression ratio is higher than the old powerplant, but not so high as to require high octane fuel. The strike at Bendix in South Bend, Ind. and Campbell, Wyant & Cannon in Muskegon, Mich. are causing shortages in spots.

No settlement was in sight in the strike of 5500 UAM-CIO employees of the four Timken-Detroit Axle Co. plants in this area. Union workers quit these plants July 7, claiming that no wage increase has been offered to piecework employees. A company spokesman said these rates are already higher than

A BULLARD Type D 8-Spindle Multi-Au-Matic in the up-to-date plant of the Standard Motor Co., Coventry, England. Note the compact, space-saving design.

**ACCORDING TO
A LEADING
BRITISH
AUTOMOBILE
MANUFACTURER**

"This one machine equals the production of twelve to fourteen capstan lathes."

So reports the *Standard Car Review*, published by the Standard Motor Co., Ltd., of Coventry, England. Featuring the BULLARD Type D Multi-Au-Matic as "an excellent example of modernization of production machinery", the magazine emphasizes the BULLARD machine's ability to perform 12 machining operations—entirely automatically—in 2 minutes! Many similar case histories show why Multi-Au-Matics are internationally recognized as key factors in the present world-wide effort to increase production volume while cutting time and costs.

GET ALL THE DETAILS

BULLARD Type D Multi-Au-Matics—made with 6 or 8 spindles in 4 sizes, for work up to 23" diameter—are designed for high speed, heavy feed, tough metal, maintained accuracy. Type K handles small and medium-sized jobs in cast iron, steel and light metal alloys, at spindle speeds up to 900 rpm. Both types are equally effective on diversified schedules or as special purpose machines for long runs.

Photographs courtesy of the Standard Car Review

**BULLARD CREATES NEW METHODS
TO MAKE MACHINES DO MORE**

BULLARD

The work. A cast differential gear case, before machining.

The same casting after completing one cycle (through 7 work stations) on the BULLARD machine. Arrows indicate the 12 machined faces . . . Piece time: 2 minutes!

Close-ups of one of the 7 automatic work stations, showing several tools cutting simultaneously.

those paid similar workers in other plants. A sizeable portion of commercial vehicle production at Ford, GM Truck & Coach Div., Chevrolet and Dodge will be halted if this strike continues another week.

The shutdown of foundry production at Campbell, Wyant & Cannon has Lincoln and Hudson passenger cars, and Ford Light-heavy truck output on the rocks. This foundry furnished cylinder blocks to these car makers as well as camshafts to all Chrysler divisions.

Serious as these labor troubles are, the situation at Ford could be a bigger blow to automotive production. The union's turndown of the published 11¢ to 14¢ an hr offered by Ford was partially due to the manner in which the company handled the offer. Other more vital factors rotate around social security benefits, insurance plan, etc. The big question in last year's settlement between Ford and the union, of whether the union could be held legally responsible for strikes, it is recalled here by observers, was successfully circumvented by an agreement lasting 1 year. The time has expired on this agreement, but this point is not again expected to be a stumbling block. Local labor experts predict the agreement of joint committee action will continue in effect.

Ford's "beat Chevrolet," pledge which materialized in the new '49er may be a factor in the present negotiations. Industry admits the new model is now the hottest and if Ford ever had a chance to fulfil their avowed ambition the '49er is the car they can use to do it. Under such conditions auto industry observers believe Ford will go more than half way to meet any reasonable labor demands in order to continue production. A strike at Ford, some here declare, is not considered at all likely.

THIS may not prove to be the case. Walter Reuther making his first appearance at a negotiation meeting on Monday, July 12, since his accident, warned Ford officials that the union "will feel free to call out 108,000 Ford production workers," if negotiators fail to reach a satisfactory accord by Thursday.

Accompanied by two bodyguards and with his arm in a sling the UAW-CIO president voiced this strike warning during a recess of the month-long negotiations. It

may be considered significant that Mr. Reuther showed up when he did. This appearance marked the first time that he has ever personally attended any discussions at Ford.

Ford workers last week were also involved in the first major test of the popularity of compulsory union membership. NLRB staffs all over the country were set to poll over 100,000 hourly-rated employees of the company in the first major test of the union shop. If a majority of the workers reject the continuation of the union shop, observers here believe it will doom the UAW's long range ambitions to win union shops at major producers throughout the country.

The Taft-Hartley law requires that the question of the union shop must be cast by more than half of the workers in the entire bargaining unit, not merely a majority of the workers' voting. For this reason the Ford locals have been putting pressure on the workers with frantic appeals to vote when the balloting takes place. Negligence of the workers to actually vote could easily cost the UAW its biggest foothold in the industry and the union leaders know it.

The Ford union shop was the only such shop that a major auto or truck maker until Kaiser-Frazer granted the same privileges, and recently agreed to extend the union shop under a new contract. The Taft-Hartley law allows union shops, provided the workers approve of them. This law, however, outlawed closed shops, under which workers must first be union members to be in employment. Although the union shop has enjoyed a 7 year tenure at Ford it has been difficult for the union to make it effective elsewhere.

DURING the recent General Motors negotiations the union had tried to build up the issue of a union shop as one of the major factors of the GM settlement. When GM subsequently offered its unique cost-of-living wage plan the union shop demand was dropped. Some union leaders prefer to consider this action as an actual sabotage of their efforts to install a union shop at General Motors.

Last week the NLRB decided that the Ford Motor Co. must function as a single bargaining unit. The company had asked the board to rule that each plant be held a

separate bargaining unit. Ken Bannon, director of the UAW-CIO National Ford department, declared, "the result of such a ruling would controvene the entire centralized setup of the company as applied not only to labor relations but to almost every other aspect of the company's operations. The company's claim was based not on fact, or on the most efficient and fair conduct of labor relations, but on the desire of the company to weaken the whole structure of collective bargaining. The company had hoped by appealing the decision of the regional NLRB director of the board to force the union shop issue into current negotiations. It is only fair and just that the board denied the company's petition."

Bottled Gas Cylinder Supply Low Because of Steel Sheet Shortage

Harrisburg, Pa.

• • • Producers of low pressure gas cylinders for propane type fuel are caught between a rapidly expanding market for their product and the shortage of steel sheets. It is estimated that if steel were freely available, the market could absorb 50,000 tons of steel per year. Saturation of the bottled gas cylinder market is not expected to occur before a few years of production at this high level, toward which the industry is reaching.

At present there are some 300 bottled gas dealers throughout the country. Leading producers of low pressure gas cylinders include, according to trade sources: Presse Steel Tank Co., Milwaukee 14 Scaiffe, Oakmont, Pa.; Weatherhead Co., Cleveland 8; Tragesse Copper Works, Inc., Maspeth, N. Y.

A new factor in the market is the Harrisburg Steel Corp., which is now operating at about 75 per cent of capacity after beginning production on a very limited basis. It is understood that the equipment installed in the cylinder production plant cost in the neighborhood of \$300,000.

The Harrisburg cylinder is made of rolled steel with brazed seam body construction. Heads and bottoms are welded in. The cylinder have a minimum wall thickness of 0.133 in. With a 100-lb gas capacity, the Harrisburg cylinder weighs only 100 lb. empty.

Die Casting by **AUTO-LITE**

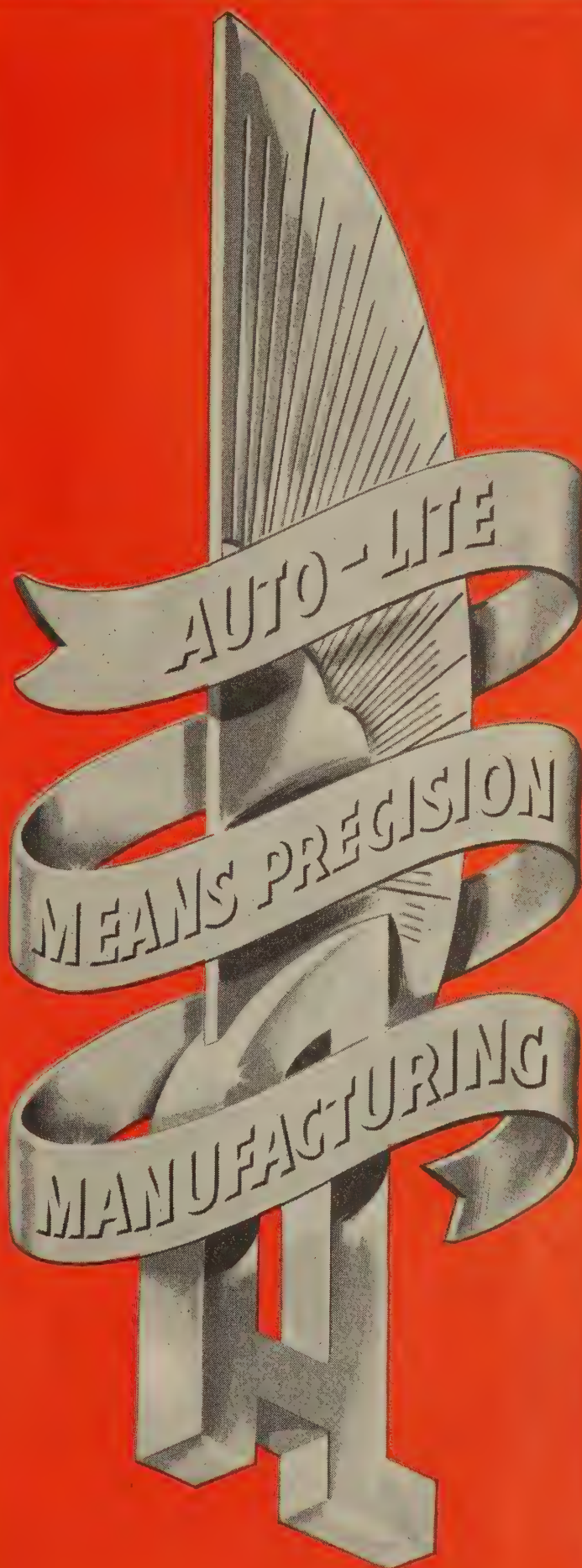
• Manufacturers of a wide variety of products are benefitting from Auto-Lite die cast research and experience. Solid engineering, advanced casting methods, proper alloying practices and improved quality through "controlled metals" have made Auto-Lite a logical source of precision die castings.

THE ELECTRIC AUTO-LITE COMPANY

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CASTING, MACHINING, FINISHING AND PLATING OF ZINC AND ALUMINUM DIE CAST PARTS

• **Voluntary allocations program moving into high gear . . . New steel demands coming . . . St. Lawrence Seaway backers getting set for 81st Congress.**



WASHINGTON—How dead is the Office of Industry Cooperation's voluntary allocations program? Despite published reports to contrary, the program is far from ready for the mortician's slab; in fact, the steel industry will probably be called upon to voluntarily allocate an additional 5 million tons of steel products, over and above the approximately 3.5 million tons already under allocation.

Those who had embalmed the program several weeks ago reckoned without the Presidential order which deferred placing into effect the mandatory allocation powers contained in the Ploeser amendment to the draft act. The White House decision to attempt to meet military needs for steel, estimated at 1.2 million tons during the present fiscal year, by voluntary means gave the program a distinct shot in the arm.

In addition, John C. Virden, director of the Office of Industry Cooperation, has held preliminary talks with Thomas J. Hargrave, chairman of the Munitions Board looking toward utilization of the voluntary procedure to fill the board's stockpiles of strategic materials.

This is not to say that the men

running the program are not faced with many problems, but none of these are so serious as to render the program unworkable. The first of these concerns expiration of the law exempting participants in voluntary programs from prosecution under the antitrust statutes. This law expires on Feb. 28, 1949, which means that at the present time OIC officials are handicapped in working out programs of more than 8-months duration. However, the Republican Congress is expected to extend the provisions of its own anti-inflation law when it returns next January. To do otherwise would not only mean repudiation of its own program, but would increase the clamor for mandatory controls to support the essential programs now being worked out on a voluntary basis.

ANOTHER problem facing OIC is the absence in the law of any provision authorizing the employment of \$1-a-year men. Industry officials now working with OIC are still being paid by their firms, but cannot officially administer the program, and, consequently are carried on the Commerce Dept. roster in a consulting capacity. This problem may be worked out without new legislation. Justice Dept. attorneys are currently scouring old statutes in an effort to find a legal out which would sanction the hiring of \$1-a-year men.

The Justice Dept. is also expected to issue a ruling which would permit the voluntary allocations program to be used for meeting the needs of ECA for European recovery purposes. The Presidential order which placed military requirements under the voluntary program made it unnecessary for Justice to issue a ruling on this subject, according to OIC officials.

But even more important, is the fact that OIC is quietly sounding out industry on the subject of new voluntary programs. Letters are being circulated among representative consumers and producers of steel asking views on extending the program to new fields. OIC is mindful of the fact that replies are tempered by the realization that the White House holds a club in the

form of the controls amendment to the draft law.

PROGRAMS already in operation have taken a substantial bite out of the nation's iron and steel output for this year. Approximately 3 million tons for freight cars, 159,980 tons for the Atomic Energy Commission, and 114,000 tons of pig iron each month for housing items. The two most recent programs to be placed in operation call for 233,000 tons of steel for warm air heating equipment and 59,000 tons for steel prefab houses. This tonnage is broken down as follows:

	Sheet and Strip Hot-rolled	Cold-rolled	Galvanize and Coated Sheet
Warm air heating equipment	73,300	78,600	81,100
Steel prefab houses	24,315	33,245	1,440

In the works are the 1.2 million ton military program and another for the oil and gas industries which is estimated to require about 2 million tons of plates, sheet, and bars.

Finally, there are indications that OIC may be moving into the nonferrous fields for industrial as well as stockpiling needs.

* * *

WHILE another Congress has come and gone without taking action on the long-proposed St. Lawrence Seaway, backers of the project will not be idle this summer. Far from it. A new Senate Foreign Relations subcommittee headed by Senator Wiley, R., of Wis., is beginning a new study of the controversial proposal. A major purpose of the new group is to store up ammunition for answering criticism of the opposition at the next session.

The subcommittee expects to complete its interim study well before the end of the year and thus will be able to submit a final report in January when the new 81st Congress organizes. Senator Wiley is expected again to take the lead in the Senate next year in support of legislation authorizing a Chicago to-Atlantic seaway capable of handling large ships.

Senator Wiley says he is satisfied

flamatic-hardened at the rate of 125/hour

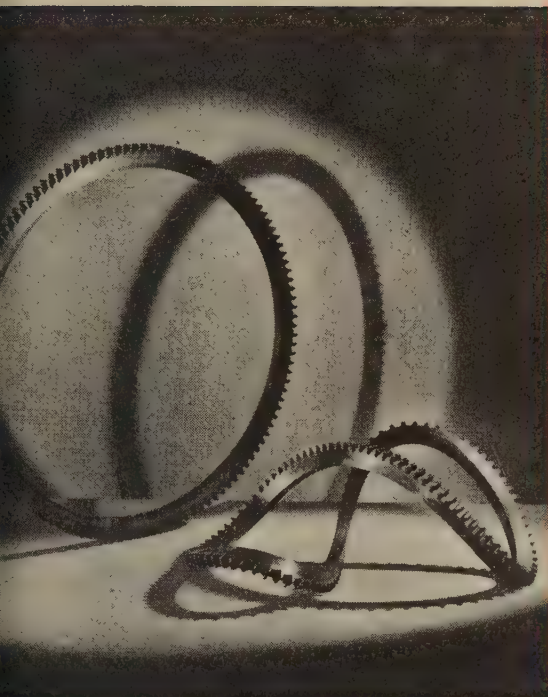


Photo above shows two 12" flywheel ring gears, 10-12 pitch, 1 1/2" wide, after Flamatic hardening. One is twisted into a figure eight to show core toughness, combined with surface hardness in a range of 55 to 60 Rc. Magnaflux showed no fractures visible. Photo at the right shows Flamatic-hardening machine in production at Automotive Gear Works, Inc., Richmond, Indiana.

That's a lot of ring gears: 125 per hour - Flamatic surface hardened to predetermined hardness patterns - to maximum surface hardness - and with cores still tough, as dramatically demonstrated in the photograph at the left. These two gears, of C-1050 forging bar quality fine grain steel, came off the line at Automotive Gear Works, Richmond, Indiana, both Flamatic-hardened in the 55 to 60 Rc hardness range, one pretzel-twisted by four men and two crowbars to prove core toughness.

With Flamatic-hardening, rapid heating puts heat where you want it. Electronic temperature control (only Flamatic has it) assures hour-after-hour uniformity yet to be equalled by any other surface hardening technique! First cost of Flamatic is remarkably low considering its speed and work size range: gears up to 16" O. D. depending on width, spindles up to 18" long depending on O. D. Check Flamatic now as applied to your surface hardening requirements. Write for complete, interesting Bulletin No. M-1611.

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THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO, U.S.A.

that a sizeable proportion of the opposition to the seaway consists of "reasonable, open-minded men who sincerely seek light on the subject, and it will be the purpose of this subcommittee to furnish such light."

"I am inviting opponents of the St. Lawrence Seaway, in particular, to make recommendations to the subcommittee on problems which they believe should be studied by it," Mr. Wiley told the Senate on the eve of adjournment. "I feel that if the opponents will give us the benefit of their suggestions, then the subcommittee can constitute an important fact-finding mechanism."

MR. Wiley says he has "no false illusions" that the subcommittee will carry on any new research, or that the conclusion to be reached will be any more convincing or acceptable to some of the opposition than documented conclusions reached in the past. "There has been a mountain of expert research performed on the seaway during all of these decades, but some of the seaway opposition remains obstinately opposed to it, ignoring all facts and arguments," according to Mr. Wiley.

The subcommittee will work in cooperation with the Library of Congress, the Army's Corps of Engineers, departments and agencies of the federal government, the Canadian government, and the New York State Power Authority.

In addition to Senator Wiley, members of the new subcommittee are Senators Smith, R., N. J.; Hick-enlooper, R., Iowa; Barkley, D., Ky.; and Thomas, D., Utah.

OIT Tightens Up To Curb Influencing of Official's Decisions

Washington

• • • A general tightening up process is under way in the Office of International Trade to curb any attempts to sway OIT decisions, authorize export movement of scarce commodities, or to divert goods for export to any unauthorized destination.

As its first step, the OIT has issued a regulation which, in effect, sets up a code of standard practices for exporter's agents in dealing with OIT. It also clearly defines

unlawful practices in handling export control documents.

Effective August 1, the OIT will bar any person from representing an exporter before the agency if he is found guilty of any of the following:

(a) Attempting to influence OIT, customs or post office officials through bribes, gifts or other means;

(b) Representing himself as having special influence over OIT or its employees and seeking business on such a representation;

(c) Charging a fee which is wholly contingent upon obtaining an export license; and,

(d) Intentionally violating export control regulations, including misrepresentations which result in illegal export shipments.

Such operations were brought to light by Congressional investigations during the past year, including the altering of figures on such documents. Without specific OIT approval, no change may be made in export control papers.

In addition to defining legitimate activities of exporter's agents, including direct contact with OIT in respect to applications, information on quotas and allocations, the regulation details specifically prohibited practices. It also outlines illegal uses of export control documents.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Armco Presents Cash Awards For Workers' Money-Saving Ideas

Middletown, Ohio

• • • A new suggestion plan which places all plants of Armco Steel Corp. under a single over-plan, providing liberal cash awards and speedier payment to stimulate money-saving ideas by employees, was announced recently by Charles R. Hook, Armco chairman.

Armco has had various suggestion systems in its plants for many years, but previously each plant operated its own plan.

Awards will be based on a percentage of savings realized by the company from the adoption of a suggestion. Gross savings will be considered as the base for determining the size of awards.

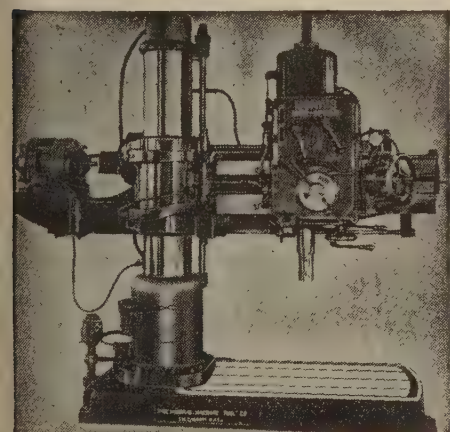
According to the announcement, even the top limit of \$2500 may be increased if management considers an idea to be "exceptionally meritorious."

● Each Morris high production machine is designed for the job. The result is more completed parts—in less time—at lower costs.

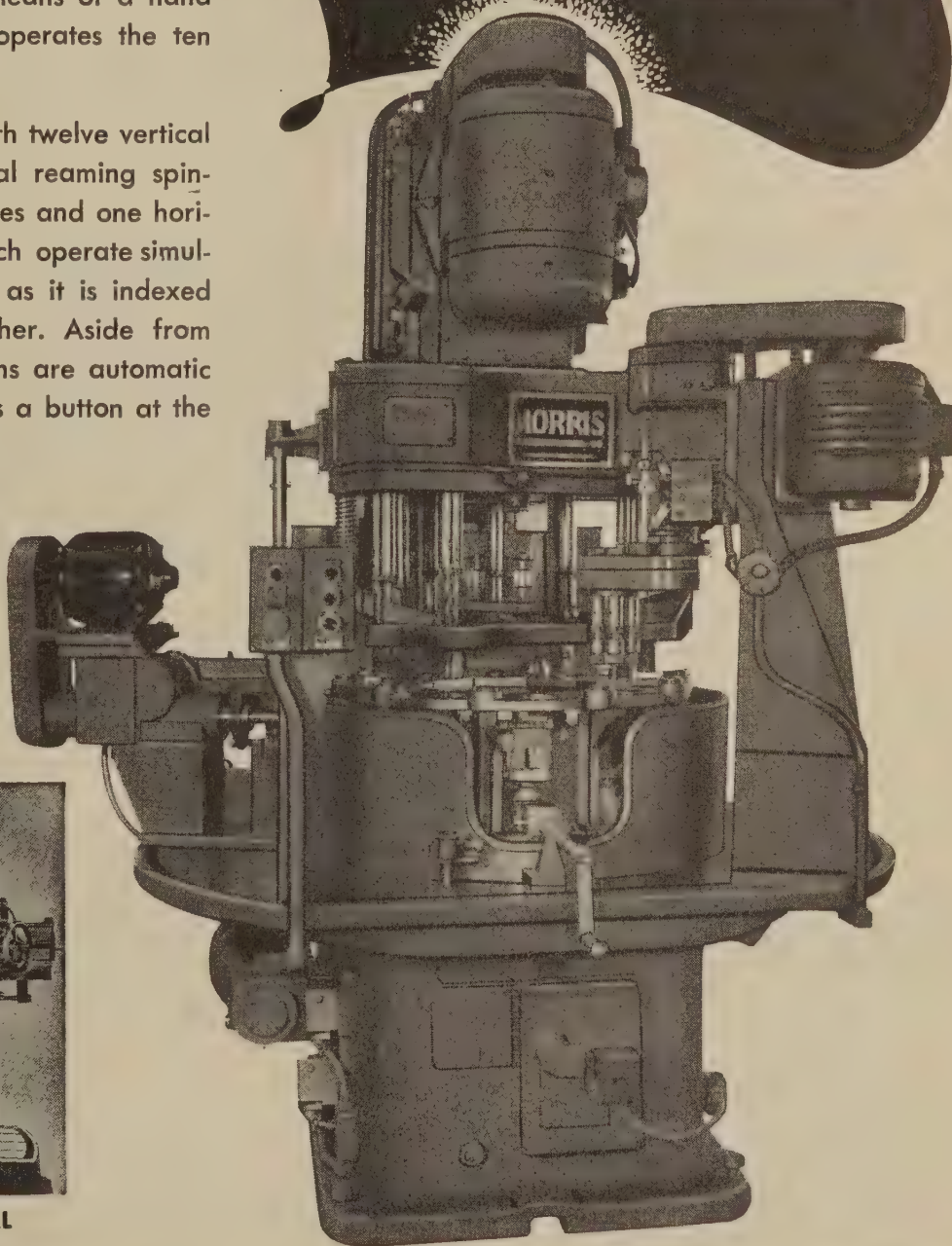
For example, the 10 station Vertical Hydraulic Automatic machine shown completes four operations—drilling—reaming—chamfering—tapping—on an automobile Oil Pump Housing and turns out a finished piece at each index of the machine. The operator merely loads and unloads the work by means of a hand clamp arrangement which operates the ten hand clamp fixtures.

The machine is equipped with twelve vertical drilling spindles, two vertical reaming spindles, four vertical tap spindles and one horizontal drill spindle all of which operate simultaneously on a work piece as it is indexed from one position to another. Aside from hand clamping all operations are automatic and operator merely presses a button at the start of each cycle.

On your work requiring multiple drilling, reaming, tapping and similar operations, on a mass production basis, consult Morris. They have the engineering experience, mechanical "know-how" and facilities to help you meet rigid production demands at low cost.

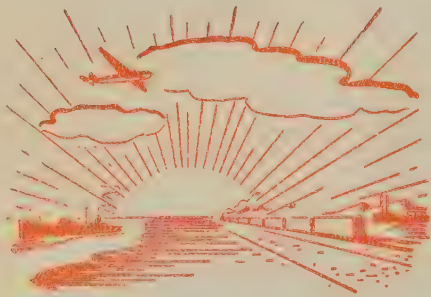


MORRIS MOR-SPEED RADIAL



The MORRIS Machine Tool Co.
CINCINNATI 3, OHIO

• Most West Coast steel users not sure if f.o.b. price basis is boon or bombshell . . . Complaints grow louder in direct ratio to distance from mills.



SAN FRANCISCO—Steel buyers of the West reacted no differently than their colleagues elsewhere when confronted with the fact that henceforth they must purchase their materials on an f.o.b. mill basis—some were confused, some were angry, and others optimistic. Historically, every ton of steel produced in the Far West has carried with it phantom freight and much of it has been delivered under a price umbrella. Last week buyers were attempting to determine whether the f.o.b. system would afford an opportunity to benefit through elimination of phantom freight and possibly at the same time improve the supply situation.

Among those believing that some good might develop from the maelstrom of uncertainty was Kenneth T. Norris, president, Norris Stamping & Mfg. Co. of Los Angeles, who said: "On the whole, we do not believe that this change in selling practice will increase the cost of the steel which we buy and necessitate corresponding increases to our customers. However, if there is a general advance in steel prices as a result of the recent increases in wages to the coal miners and in freight rates, this increase will be reflected in our selling prices.

"While it is too early to determine the exact effect of the change in selling practice, I am satisfied that in the long run the buyers of steel in this area definitely will be benefitted. I feel that the new method of selling steel will accelerate the decentralization of steel producing facilities with a greater tendency to balance production capacity in a given area with consumption.

"This is in line with the developments which have been taking place on the West Coast during the past 3 or 4 years.

"In the long run, prices for steel products will be determined by the cost of production and the cost of transportation to market. I have been sold on the ability of western mills to make steel at costs comparable with those prevailing in the principal eastern production centers. Geneva has already demonstrated its ability to produce on a competitive basis, and the West is today enjoying the benefits of having a low cost producer with its product being priced in line with prices prevailing in Gary, Pittsburgh and Birmingham. Currently, Geneva products are costing West Coast buyers from \$8.00 to \$10.00 per ton less than the same products can be secured from eastern mills.

"I am sure that this trend will continue and that with the completion of the new mills of the Columbia Steel Co. at Pittsburg, Calif., and here in southern California, the West will benefit by having truly western prices on western-made steel.

"I THINK it is too early to determine the effect of this change in the method of selling steel, because as yet the f.o.b. mill prices have not been announced. When these mill prices have been announced, we can then make an analysis of those items which we purchase and determine whether we have been benefitted or will be penalized.

"We do not anticipate any change in our suppliers and al-

though we appreciate that we may have to pay a little more for some of the items which are being produced in the Midwest and in the Pittsburgh district where the mills have been absorbing a small amount of freight, this will probably be offset by savings in other instances."

In commenting on the situation, Morris B. Pendleton, president, Plomb Tool Co., Los Angeles, said: "Generally speaking, the effect in some instances will be a disassociation of supplier and consumer with a realignment of source of supply. This cannot, of course, be determined until a later date when all the price data are made fully known. We believe, however, that it will be a very fine thing for the western steel industry now to be placed firmly upon its own feet."

Steel warehouse operators were especially confused in that they faced not only a problem of establishing new prices when their costs are known, but were wondering whether their trade practice of delivering at uniform prices at points varying in mileage from their plants would be legal. For example, warehouses in San Francisco have customarily delivered to Stockton, San Francisco, Oakland, Sacramento and San Jose for 10¢ per 100 lb.

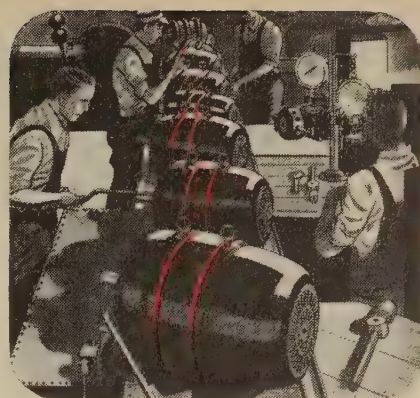
THROUGHOUT the steel-consuming industry there was a widespread belief that so long as the present short supply persists, any increases in delivered prices will not prove prohibitive, but in most instances will have to be passed on to the ultimate consumer. Here again, this was a matter of conjecture because of a lack of f.o.b. prices. Westerners have for the past year or two become accustomed to paying f.o.b. mill prices in the East and all-rail freight to the coast in order to get the materials needed. This all-rail freight from Chicago, for example, meant that a western user must pay \$27.60 freight per ton. Rail and water from Pittsburgh to the coast has



1 1780—Already the newly created Republic felt stirrings of the industrial greatness ahead. A Connecticut hat maker, for example, experimenting with techniques of increased production, pushed output to three a day.

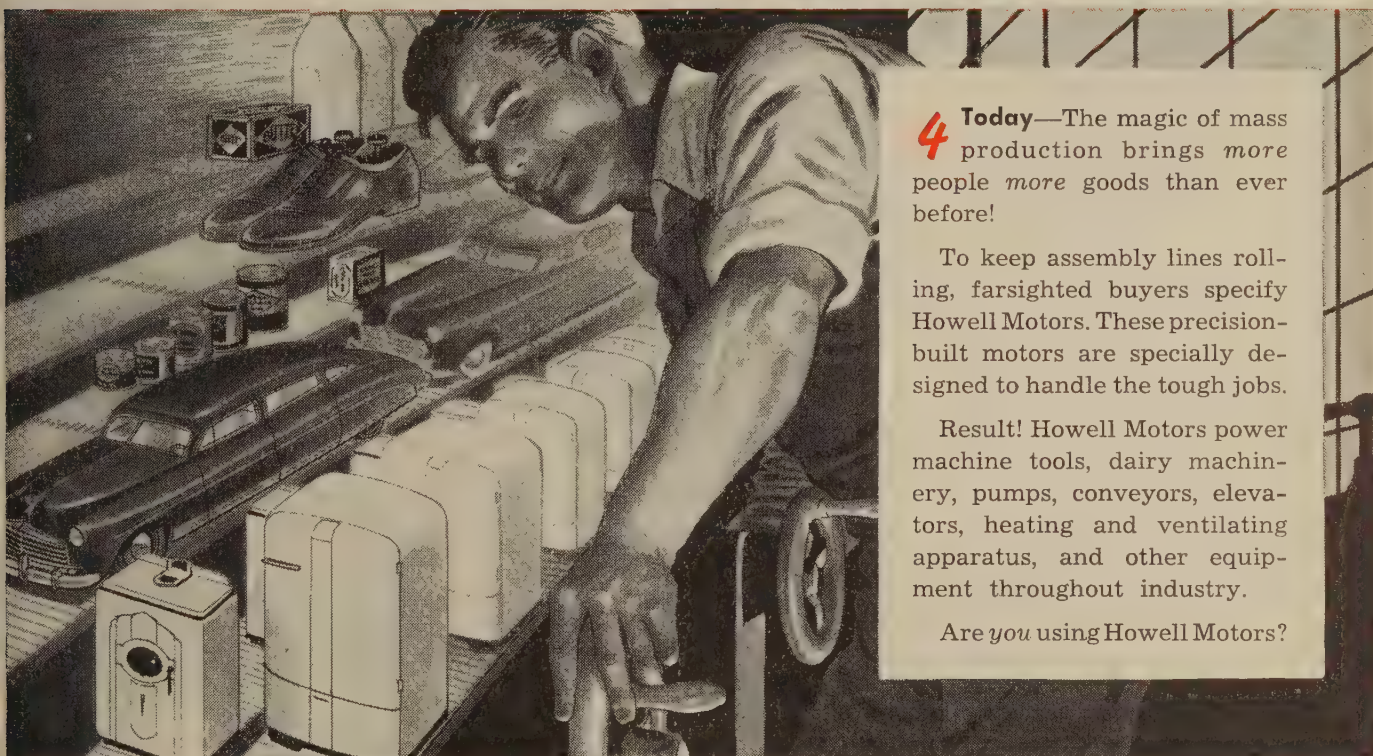


2 1876—Mechanical marvels by the thousand at the Philadelphia Centennial dramatically spotlighted America's ability to invent, design, produce. Industrial stage was now set for impact of low-cost electricity, soon to come.



3 1915—Howell "Red Band" Electric Motors appeared! Soon, these rugged, industrial-type motors won recognition in hundreds of vital industries. Assembly lines were on the move! Ford produced its millionth car!

MASS PRODUCTION . . . AMERICA'S MIRACLE!



4 Today—The magic of mass production brings *more* people *more* goods than ever before!

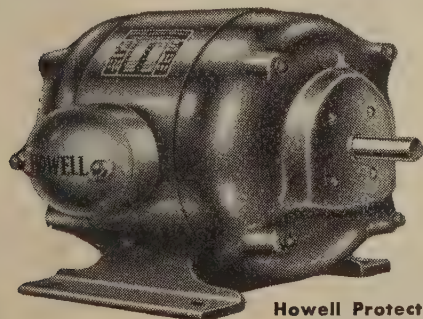
To keep assembly lines rolling, farsighted buyers specify Howell Motors. These precision-built motors are specially designed to handle the tough jobs.

Result! Howell Motors power machine tools, dairy machinery, pumps, conveyors, elevators, heating and ventilating apparatus, and other equipment throughout industry.

Are you using Howell Motors?

Free enterprise with mass production raises the standard of living—provides more goods for more people at less cost.

Here's another precision-built Howell Motor . . . industrial type with copper or bronze bar rotors . . . specially insulated . . . statically and dynamically balanced.



Howell Protected Type Motors

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Manufacturers of Quality Industrial Type Motors Since 1915

been \$24.27 per ton; all-rail from Pittsburgh, \$31.11.

Few industrialists were found who believed that the change in pricing was of great benefit to them, and typical of comments was that made by L. G. Fox, manager, San Francisco Chamber of Commerce, who has been closely identified with industry in the West for many years. He said, "Apparently steel users have not been unhappy with the basing point system, which was a product of evolution, and in some instances it was good to have the East and the West on the same delivered base. Personally, I never heard anyone spell out any better method, and industry nationally has been located on that basis. Undoubtedly if we could relocate all of our mills and fabricators, we would get something better. Apparently one result of this new price system will be that some fabricators favorably located in proximity to a mill where they will get steel delivered at the lowest possible cost may be enabled to extend their markets for finished products."

IT is generally believed that the severest blow pricewise under the new system will fall on users of pipe skelp, tubular goods, special sheets such as enameling stock, alloy steel and special and large structurals which are not made in the West.

In the Pacific Northwest there was general unanimity of thought condemning the new price basis, with most comments punctuated by language unfitting a drawing room.

Not one of eight users queried had a good word for the change in policy. Sheet metal users point out that there is not a sheet metal mill in the Northwest, while there are several in California, which means that northwest sheet metal fabricators will be paying from \$8 to \$10 more a ton than their competitors in California. Of course it is admitted by Seattle manufacturers that they will be getting some grades of steel cheaper than their competitors in Bellingham and Everett, but they will also be paying more for steel shipped from Geneva, Utah, than their competitors in Oregon and California.

"Instead of creating a competitive plan," Mr. Colby of Colby Steel & Engineering, Seattle, said, "and instead of cheapening the product, they are making it cost more to

produce, if you get away from a mill."

Some of the Northwest fabricators believe there is some possibility of relief from what they term "the crisis" after the fall elections, when political influence may be brought to bear on Congress to enact legislation permitting the reestablishment of the basing point system.

One fabricator said, "The old price regulation was so unsatisfactory, so unfair, that something had to be done." And another manufacturer said, "But this is the most outlandish thing a Washington group could have thought of. In fact, I don't think they have done any thinking back there, but it has caused us to do plenty out here."

SALT LAKE CITY—First move of the National Labor Relations Board to block unions whose officers have refused to sign the non-Communist affidavit from using state conciliation machinery was taken here in connection with cer-

tification proceedings for United Steelworkers of America at the Kaiser-Frazer Iron-ton plant.

The state industrial commission, operating under a law which makes no mention of communism, was preparing to certify the USA union as the bargaining agent when NLRB attorneys stepped in and filed an action for a restraining order against such certificates in the local federal district court. The theory is that until the union complies with the provisions of the Taft-Hartley Act it is not entitled to make use of either federal or state labor board machinery. The national board will contend that the blast furnace is in interstate commerce and therefore under federal jurisdiction, despite the fact that virtually all the raw materials used in the operation originate in Utah.

Dan Edwards, chairman of the Utah board, expressed the view that if the Kaiser-Frazer plant is found to be outside state jurisdiction, the state labor relations board "might just as well fold up."

Blanket Licenses To Control Exports Of Steel Mill Products

Washington

• • • All steel mill products subject to export control, with the exception of material not generally salable in the domestic market, have been added to the list of commodities which may be authorized for shipment under one blanket license to two or more consignees in any one foreign country, according to an announcement of the Office of International Trade.

The materials excepted from the new provision and, consequently, not exportable under blanket licenses, include war surplus iron and steel commodities, and products rejected at the steel mills because of defects. Other iron and steel materials not generally salable in the U. S. market are also excepted.

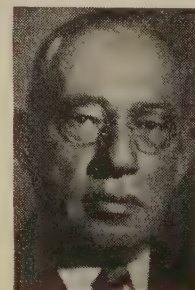
Under the blanket license procedure, any exporter who holds accepted orders from two or more purchasers in any one foreign country may choose to file only one application for an export license. In applying for a blanket license to export steel mill products, however, he must comply with the same regulations which govern shipments of iron and steel commodities under

individual validated licenses. These provisions, which pertain to evidence of availability, time for submitting applications, and price, are explained in Comprehensive Export Schedule No. 25 (page 55) and in Current Export Bulletin No. 465.

Executive Retires From Bethlehem Organization

San Francisco

• • • E. B. Hill, vice-president and treasurer of Bethlehem Pacific Coast Steel Corp. has retired after 48 years with the organization.



E. B. Hill

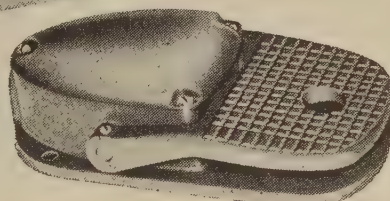
After graduating from Yale University, Mr. Hill began with the Bethlehem Shipbuilding Corp. in 1900. He advanced through the ranks and in 1917 became Assistant General Manager of the

Fore River Yard near Quincy, Mass.; in 1930 he was made vice president and treasurer of the Pacific Coast Steel Corp.; and in 1945 when the Bethlehem Steel Pacific Coast Corp. was formed, he assumed the position that he held at retirement.

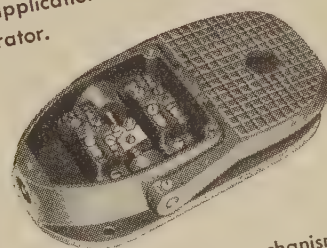
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**CLASS 9002
TYPE AW**



Type AW Foot Switch without guard—
for applications not involving hazard to
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Self-contained contact mechanisms are
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- ✓ Streamlined to match modern machine styling.
- ✓ Heavy cast case, gasketed for oil-tight applications.
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- ✓ Wide pedal, operable from three directions but protected against accidental contact or falling objects.
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- ✓ Self-contained contact mechanisms are easily wired and readily replaced.
- ✓ Snap action contacts, rated 600 volts pilot duty, A. C. or D. C.
- ✓ Available, with or without pedal guard, in several types.

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Double pole, double throw	AW 3	AW 4
Two stage, each stage single pole double throw	AW 5	AW 6

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Address Square D Company, 4041 N. Richards St., Milwaukee 12, Wis.

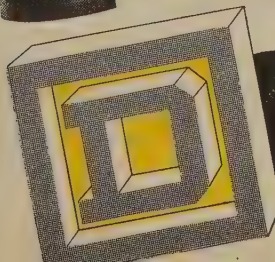
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- **A. A. Derse** has been appointed vice-president, manufacturing, Murray Corp. of America, Detroit. Mr. Derse has been associated with the corporation for 23 years and prior to his new appointment was a manufacturing staff executive.

- **Thomas W. Lloyd**, formerly superintendent of the Baltimore works, has become district superintendent of Harbison-Walker Refractory Co. at Chester, Pa., and Baltimore. **A. M. Tvergaard** has been named superintendent of the new Baltimore plant. Mr. Lloyd joined the East Chicago works of the company in 1929. Mr. Tvergaard joined the Northwest Magnesite Co., a subsidiary of Harbison-Walker, in 1944, and was appointed manager of that plant in 1947.

- **Peter Robertson**, formerly works manager of Truscon Steel Co., has been appointed assistant to the district manager of Republic Steel Corp.'s Cleveland district. **Douglas K. Forsyth**, formerly assistant works manager, has been appointed to succeed Mr. Robertson at Truscon and **John H. Hamill**, formerly superintendent of Truscon's structural steel department, has been appointed assistant works manager.

- **George L. Roth** has been elected president of White-Roth Machine Corp., Lorain, Ohio. Formerly vice-president, Mr. Roth succeeds **G. A. White** who has retired. **I. G. Roth** has been appointed vice-president. **M. J. Powers**, formerly purchasing agent, has been elected secretary and **Harry Youtt**, who has served as production manager, is now general manager.

- **F. L. Sargeant** has been appointed manager of the New York sales division of Reynolds Metals Co., succeeding **Stuart Smith** who has been named special representative to the U. S. Air Forces with headquarters in Reynolds' Dayton office. Mr. Sargeant joined the company in 1941 and has recently served as manager of the Kansas City and St. Louis sales divisions. **F. F. Tiffany** has been named manager of the Dayton sales district, succeeding **Alan D. Tate**, who has resigned. Mr. Tiffany joined the company in 1947. **Wilfred P. Lawless** has been chosen to succeed Mr. Tiffany as manager of the Nashville sales district. Mr. Lawless was formerly in charge of the Charlotte, N. C., sales district.

PERSONALS

• • •



J. H. LAMMERT, vice-president,
Oliver Iron & Steel Corp.

- **J. H. Lammert** has recently been elected vice-president of Oliver Iron & Steel Corp., Pittsburgh. Mr. Lammert joined Oliver in 1905 as a messenger. He has served in the mailing, sales, order entry and purchasing departments, and will continue as general purchasing agent to which position he was appointed in 1935. **Hugh A. Dewar** has been named a district sales manager of the pole line hardware sales division, in Los Angeles, succeeding **John A. Duncan**, who has retired.

- **Sherman L. Crary** has been appointed treasurer, Bethlehem Pacific Coast Steel Corp., San Francisco, succeeding **E. B. Hill** who has retired as vice-president and treasurer. Mr. Crary joined the Accounting Dept. of the corporation in 1935. He was later transferred to the Treasury Dept. and in 1945 was named assistant treasurer in which offices he served until his new appointment. Mr. Crary will continue as secretary.

- **J. B. Dear** has been appointed assistant sales manager of the Duraloy Co., Scottdale, Pa. Mr. Dear has been with the company many years in the factory sales office.

- **John G. Seiler** has been elected executive vice-president of Tube Turns, Inc., Louisville. Mr. Seiler, formerly vice-president and sales manager, joined the company in 1930.

- **W. D. Reed** has been elected president, and **Richard L. Kopp** secretary, of Star Tubular Products Co., Chicago. Mr. Reed was formerly vice-president and Mr. Kopp, assistant sales manager, of Sawhill Mfg. Co., before their resignations to assume their respective duties at Star. Both gentlemen were previously associated with Republic Steel Corp. in the Pipe Sales Div.

- **William N. Smith**, **Robert A. Bilaitis** and **H. Corwin Miller** have been appointed sales representatives, Universal-Cyclops Steel Corp., Bridgeville, Pa. Mr. Smith will have headquarters at the Chicago office, Mr. Bilaitis at the Detroit office and Mr. Miller at the Worcester office. **V. L. Goulet**, formerly sales representative in the Chicago office, has been transferred to the new sales office in Rock Island, Ill.

- **Robert A. Webber** has been made manager of the Electric Furnace Div., Electro Refractories & Alloys Ltd., Cap-de-la-Madeleine, Quebec. Mr. Webber was formerly associated with Exolon Co., Ontario.

- **Robert A. Morris** has been named assistant to the president, Acme Steel Co., Chicago. Mr. Morris was formerly director of advertising-publicity. **F. R. Grove, Jr.**, formerly assistant advertising manager, has been named advertising manager.

- **Harold T. Anderson** has been named assistant to the general sales manager in charge of sales production relations, Worthington Pump & Machinery Corp., Harrison, N. J. Mr. Anderson has been associated with Worthington since 1924.

- **J. N. Candler** has been appointed director of manufacturing, Norge Div., Borg-Warner Corp., Detroit. **H. L. Clary** has been named director of sales and **W. S. Law** becomes general sales manager. Mr. Candler has been associated with Borg-Warner since 1940. Mr. Clary joined the corporation in 1945 and Mr. Law in 1946.

- **George Olmsted** has been elected a director of Bell Aircraft Corp., Buffalo.

(CONTINUED ON PAGE 144)

CMP
THINSTEEL



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• Yugoslav Peasant Prospers Under Tito Rule . . . Five Year Plan Aims At Rapid Industrial Gain . . . Shortage Of Trained Personnel Retards Progress.



LONDON—Few if any of the foreign visitors to Yugoslavia this summer can have guessed that there was going to be trouble between Tito and the Cominform. But in the past few months it had been evident that there was some trouble inside the country. This was thought to be an internal struggle over policy and power which would settle itself. It was also clear that great strain was being caused by the efforts to achieve the high aims of the Five Year Plan. Neither of these things was secret. The latter was a problem openly discussed by leaders and people alike. Both were dealt with in two illuminating speeches made in April by Edward Kardelj, deputy president of the Federal Government, and by Boris Kidric, chairman of the Economic Council.

It was Kardelj, one of those denounced in the Cominform attack on Tito, who made public the basic disagreement between Yugoslav leaders on the policy to be adopted towards the peasants and agriculture. Kardelj declared that the role played by the countryside in the economic structure had been ignored by leading planners; the state had not done enough for cooperative farms owing to the obstinate opposition of the finance and planning committee. This incorrect attitude was reflected in this year's

budget, and for the future there must be a new attitude towards socialization of agriculture.

IN Yugoslavia today one thing is clear: Most peasants are doing well under the present regime and it is obviously so far government policy to allow this. In most parts of the country, and especially in the rich farming areas north and south of Belgrade, the peasants look prosperous. They have new clothes, new household goods and rolls of banknotes. In the market they fix their price and refuse to bargain. Only a very small number have so far joined the scheme for cooperative farming, and cooperative farms still represent a very small percentage, probably not more than 5 pct of the country's agricultural economy. Even this summer it has been repeatedly stated that government policy on this matter is to encourage the peasants to go in for cooperative farming by persuasion and not by pressure.

The new linked prices system for marketing peasant produce which was launched in April of this year was an excellent example of the government's careful handling of the villages. By this system peasants can sell their produce to the state at low fixed price and, in addition to the money payment, they receive coupons which enable

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them to buy industrial goods from state shops at a lower uniform price. Peasants who do not wish to do this can sell on the free market, where prices are anything from three to six times higher than those offered by the government; but in that case they have to buy their industrial goods also at a high free market price.

THE Five Year Plan, which has already been working for a year and a quarter, aims at a very rapid industrial development whilst agriculture is to remain comparatively undeveloped.

Over five years more than 115 billion dinars is to be invested in in-

dustry and only 19.4 billion dinars is given to agriculture. The result aimed at is a great increase in coal and metal mining, the electrification of the country through a series of power stations, a new modernized system of communications and a whole series of new industries. Both Kardelj and Kidric admitted this scheme to be highly ambitious but defended it as possible if the Yugoslav people make an all out effort. It certainly would not be possible if the government were trying conclusions with the peasants at the same time.

The difficulties of industrializing rapidly a country which until recently was carrying more than 50 pct illiterates and had very little industry before the war are to be seen in Yugoslavia today, particularly in the more backward parts of the country. The shortage of trained personnel is obvious to all visitors and affects all major aspects of life, economic, administrative and political. Colossal efforts are being made to fill the gap. Universities, trades unions, training colleges, schools, adult education are all concentrating on training specialists. At the same time every effort is being made to urge people to greater production: payment according to output, privileges and prizes, extra rations all play their part. Propaganda encourages voluntary labor for the building of roads, houses, schools. Buildings are springing up everywhere, so that the constructional side of the program is going ahead.

The next stage will come shortly when new industrial buildings have to be filled with the necessary machinery and equipment. Most of this must of necessity be imported from abroad; from Sweden, Switzerland, Italy as well as from countries in the eastern bloc, Poland, Czechoslovakia, Hungary and the Soviet Union. Failure to receive capital equipment and raw materials through inability to produce the necessary exports, minerals, timber, food, or through economic sanctions following the present disagreement with the Cominform would spell ruin to the Five Year Plan as at present conceived.

Nickel Cast Iron helps Elmes...

MASTER HIGH STRESSES IN HYDRAULIC PRESSES

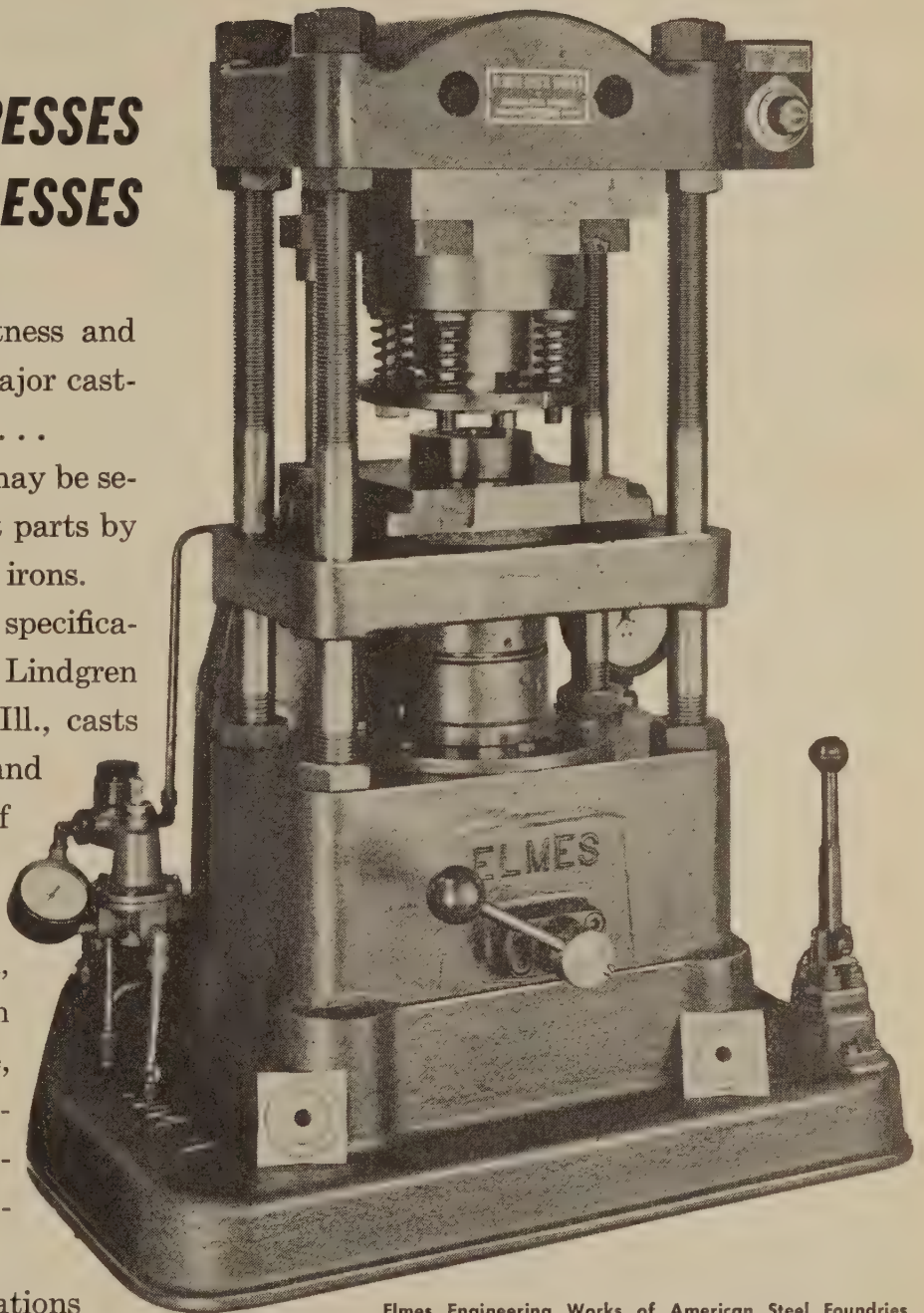
Extra strength, pressure-tightness and wear-resistance characterize major castings in this "Hydrolair" press...

Moreover, these properties may be secured whenever needed in cast parts by producing them in nickel alloy irons.

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK 5, N. Y.

Industrial News Summary...

- **Steel-Coal Wage Cost High**
- **Industry to Cover In Prices**
- **Scrap Markets Are Stronger**

THE steel industry was one of the last major industrial groups to put its financial house in order as it faces what may be the greatest inflationary boom in American history. It could have done much better with the public and its customers had steel firms announced price increases at the same time wages were raised. The price increase will probably be attacked from all sides as an inflationary step which will put more air into the already rapidly ascending balloon.

But steel firms have a good story to tell—if they can get it across. The coal settlement will mean an added cost to the industry of about \$80 million a year at current rates of output. The steel wage and salary raises granted last week and this week will cost the industry another \$195 million a year. Taken together these two wage and salary raises alone will mean an added cost of \$4.30 a ton on finished steel to be made within the next 12 months.

When all the steel price increases have been recorded it will be found that on an annual basis they will cost the consumer more than \$500 million or about 7 to 8 pct of the total revenues received by the steel industry in the past year. The difference between that figure and the \$275 million coal and steel wage and salary bill must take care of (1) freight increases which bore heavily on steel firms in purchase of raw materials, (2) increased cost of equipment which has gone up so much in recent years that expansion plans have been revised, (3) increases in raw materials such as scrap, oil, nonferrous metals, chemicals and other materials going into the making of steel. The rise in steel prices a year ago and the intermittent increases after that period have not offset higher steel-making costs. Balance sheets show it. Those to be made public over the next few weeks will also indicate the trend of expenses.

FOR the first time in years steel companies have abandoned the meek and apologetic attitude taken by some (but not by others) in making price increases. The anti-inflation experiment was a flop. Most steelmakers thought it would be. But the gamble was taken. And it cost the United States Steel Corp. close to \$5 million just to find out that forces stronger than it were needed to stop the upward spiral in prices and wages. The yakety-yak of stockholders, the knowledge that the return on steel investments was too small and that protection of investments already made in an inflation riddled economy were shaky, put the final needle in steel management.

Just what the final outcome of the third round of wage and price increases will be no one knows. But that is no reason to expect the country's basic industry to play the rôle of Simple Simon while wages and prices all around it turn ever upward. Steel firms' action on prices during the war and since VE day have been anything but spectacular when compared with almost any other group—so the industry's econo-

mists and financial wizards scream when they go into their regular arguments before the boards of directors.

Philip Murray has finally capitulated to the need for a percentagewise increase in pay—the first in the history of the steelworkers' union. In each prior wage advance the raise has been a straight cents per hour boost. The spread between skilled and semiskilled workers has become ever smaller since 1937 when the union got its first contract. But in the past year special wage classifications have been established. Training on the job takes the worker from one class to another. The type of raise announced last week and this week fits better into the wage setup now prevalent in most large steel firms. The new raise brings the average hourly wage in steel to about \$1.71 compared with about 85¢ an hour in 1940. Average weekly pay under the new rate will be close to \$65 for a week of 38 hours compared with \$60 a week before the raise.

UNDER the new contract terms steel companies will settle with the coal miners before the steelworkers next year. This will mean that Philip Murray will have the last crack at wage negotiations. In former years he settled before the United Mineworkers took on the coal and steel industries.

Many steel fabricators think they will have to move closer to steel mills if they are to stay in business. The f.o.b. mill system with consumers paying the freight is giving some companies the shakes. Some steel experts believe that auto parts companies will move out of Detroit in order to get cheaper steel and, at the same time, try to get closer to assembly plants in other parts of the country. A report that Kelsey Hayes Wheel is considering moving to Pittsburgh recalls a similar frame of mind several years ago. The same company at one time had plans to establish a plant on Neville Island in the Pittsburgh district, having started negotiations with a Pittsburgh steel firm for property owned by the steel company.

Steelmen face higher scrap prices. The so-called formula prices (similar to basing point prices which have been thrown out in the steel industry) are cracking in some areas. This type of pricing went by the board in Chicago this week where heavy melting steel again staged an increase. The average boost there was \$1 a gross ton. This moved THE IRON AGE scrap composite price up 33¢ a gross ton to \$41.33 a gross ton. Scrap consumers are on the warpath over alleged inferior grades of scrap being shipped. However, they share some of the blame over the past several months since they have in some cases played shuteye when carloads of scrap were shipped into the mills.

The steel ingot rate this week advanced 2 points to 94 pct of capacity. Nothing now stands in the way of a new peacetime record unless the scrap shortage this winter takes a turn for the worse—as some predict it will.

• **RENEGOTIATION**—Defense Secretary Forrestal hasn't decided yet whether or not to insert renegotiation clauses in contracts for aircraft, ships and overseas military installations. Second Deficiency Appropriation Act authorizes the Secretary to add renegotiation clauses to the contracts as he sees fit. But in another public law passed in the closing day of congress insertion of the clause in aircraft contracts is made mandatory. So only ships and overseas construction are under cost study by the department at this time. Look for appointment of a Contract Negotiating Board in the near future to take care of these two fields.

• **ROUGH ESTIMATE**—Congressman Herter, vice chairman of the House Select Committee on Foreign Aid, has estimated that we will ship \$190 million worth of steel to the 16 nations participating in the European Recovery Program. At least three fourths of it will cross the Atlantic in the form of steel mills, machines and machine tools able to produce more steel.

• **MORE INGOTS**—Despite the second quarter setback in steel ingot production due to the coal strike, output for the first half was nearly 722,000 tons larger than the first half of 1947. This is a gain of 1.7 pct. In addition electric furnace production set an all-time monthly record with 409,931 in June as compared with 408,821 tons on Oct. 1943.

• **NOT YET**—International Harvester Co. has informed THE IRON AGE that they have no intention of switching to f.o.b. plant prices on farm implements in the near future. They are studying the plan and say that the move, if they make it, appears to be several months away. Reports have been circulated that Harvester had actually decided to change their pricing system. This, they added, is a possibility—but not yet a fact.

• **DROPS TITANIUM MARKET**—Electro Metallurgical Sales Corp. has discontinued the manufacture of low-carbon 25 pct and 40 pct ferrotitanium used as a stabilizer in the production of austenitic stainless steel. Its production of manganese-nickel-titanium and silicon-titanium, special purpose alloys, will continue. Present manufacturers of low carbon ferrotitanium include Titanium Alloy Manufacturing Co. and Vanadium Corp. of America.

• **WAREHOUSE PRICES TOO**—U. S. Steel Supply Co., a U. S. Steel subsidiary, has established f.o.b. warehouse prices. These prices consist of the f.o.b. mill price, plus freight, plus a reasonable profit. Within a 60 mile radius of each of 11 warehouses, it is understood that they will deliver steel on their trucks for a standard 18¢ charge. As yet the trade has not been notified of the exact new prices which the company will probably have to bill on a retroactive basis.

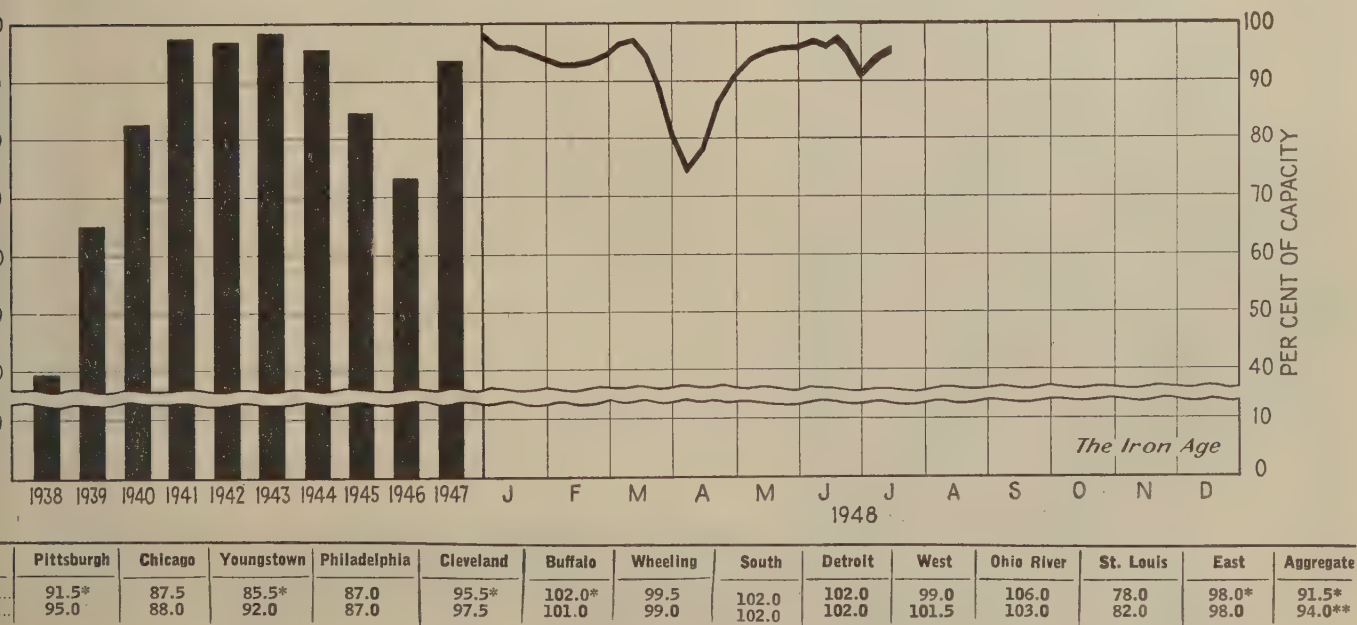
• **NEW DETROIT PRICE**—Effective July 13, Great Lakes Steel Co. went f.o.b. mill on all products. The new mill price is 20¢ a 100 lb above the general f.o.b. mill price in Pittsburgh and Chicago. The only exceptions to this are on carbon and alloy plates. Carbon plates are 25¢ over the Pittsburgh price while alloy plates are 35¢ higher.

• **A HIGHER LEVEL**—Total payroll for the iron and steel industry in the first 5 months of 1948 was \$874,576,000, an increase of 10.5 pct over the corresponding months for 1947, according to the American Iron and Steel Institute. Of the increase, 80 pct went to employees receiving hourly, tonnage and piecework wages.

• **KAISER TOO**—Kaiser Steel Co., Inc., has announced the abandonment of its present pricing system on steel products made at its Fontana, Calif., plant, effective July 19, and the adoption of f.o.b. mill basis selling. Delivered prices in Los Angeles, 50 miles from the plant, will be substantially the same as have prevailed. The few steel consumers nearer the plant will benefit by lower delivered costs while more distant users will be penalized. Freight rates from Fontana to Los Angeles are \$1.65 per ton and to San Francisco, \$6.39 per ton.

• **PIG IRON DIVY MIXED UP**—Producers participating in the voluntary allocations program for housing were startled to receive a list of customers from OIC with designated tonnages well above what they have been getting. Some customers in the housing supply group were omitted to their surprise. Others were allocated a tonnage above what had been requested. Some producers expect to whittle down the allocation tonnages by agreement with the customers before executing the commitment required by OIC, so as to protect the balance of their customers who do not come under the voluntary program.

Steel Ingot Production by Districts and Per Cent of Capacity





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**JONES & LAUGHLIN
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PITTSBURGH 30, PA.

Steel Pricing Change Snap For Mills, Headache For Consumers

Chicago

• • • Operating under f.o.b. mill steel prices, steel sales and detail men report is going to be very nice. Those mills which swung over some time ago report the system is simplicity itself, but their billing clerks don't have anything to do and such staffs are about to be cut. No longer does a mill have to carry prices out to four decimal places on each and every piece of paper, carbon copies included, through all the different departments. They don't have to prepay freight which in cases is a three or four line haul. In addition, the extra maneuver of figuring tax on freight is out the window.

All shipments of a certain product from one mill are now at a flat price with no ifs, ands or buts. This has so greatly reduced the paper work that officials who have had the jump in experience on the other mills declare, "they will like it, too." Some mills in the past, operating under the discarded basing point practice, very often tied up considerable money in prepaid freight charges. This is now unnecessary. Further, the wits point out they think it is illegal. All of the various accounts on the mill books under the new system are on the same basis, whereas formerly they were split between freight absorbers, phantom freight getters, and in special cases f.o.b. mill accounts on certain products only.

To the consumer now falls the complex and costly pricing chore heretofore carried by the mill. Some consumers report they will be confronted with a dozen or so different prices even on the same steel items. They report further that it will be impossible to figure their costs before the actual manufactured item is made, or at the soonest when what percent of what prices inventory goes into which item.

At the moment they say they will be forced to base the estimate of their cost on the most expensive of the basic steel items they buy. After six months or so experience under the new system, they then believe they can intelligently assess

Here Are Some Troubles That Customers Already Buying F.O.B. Mill Are Having

• • •

By D. I. BROWN
Chicago Editor

• • •

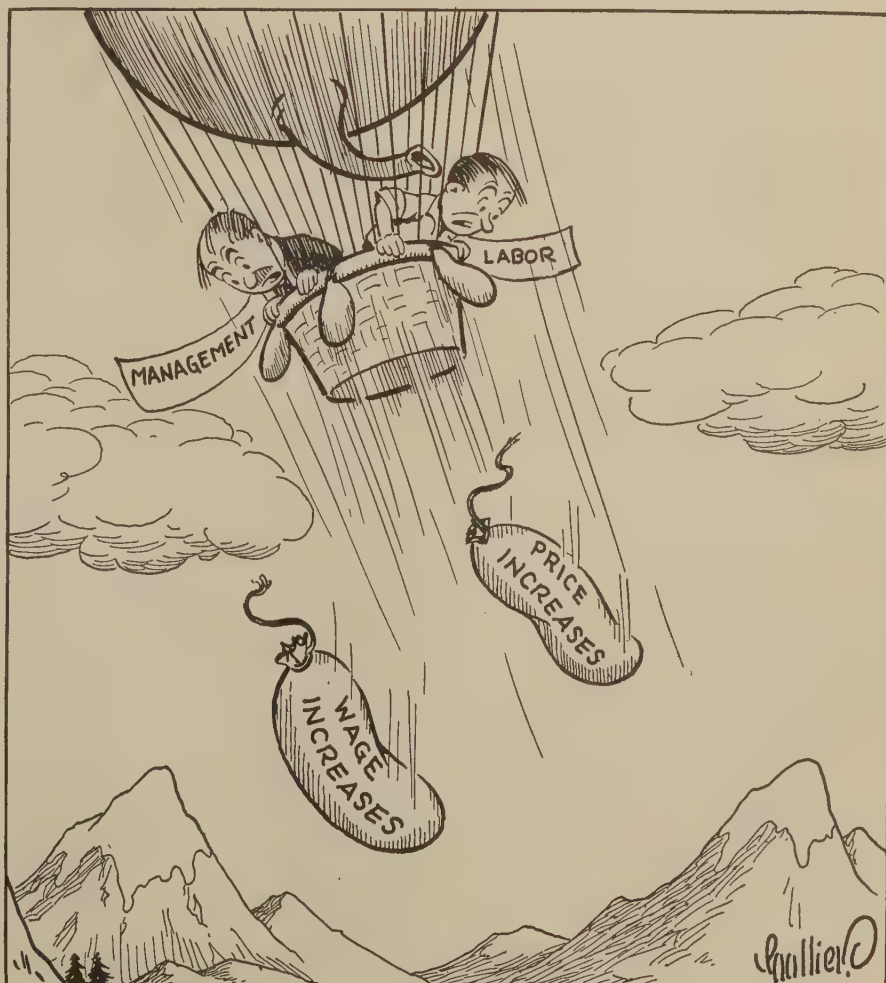
their true costs. Actually this is already in practice in a great many manufacturing plants. It started weeks ago when the price reduction on steel items by the producers ended up with variances in most basing point areas. Where labor is the chief cost of making a product,

such as an automobile, the difference is meaningless. Whereas to a cold drawn mill buying hot rolled rods at various prices, the difference is appreciable and important.

The large number of employees now working in the price detail offices of the large steel producers will be drastically cut, if the experience of other mills is any criterion. Very possibly large consumers will hire such staffs outright as these employees are already trained and will merely have to apply their knowledge in the opposite direction.

This is one hidden cost in consumers paying freight, which is not yet widely appreciated. Not only do consumers pay the freight, they have to find out what it is first. Also, according to the FTC

What goes up must come down — Or must it?



cease and desist order not yet issued, they won't be allowed to look in the freight book which was the steel industry's bible. Whether they look or not is unimportant, they have to hire people even to do this and that will cost money.

That consumers are willing to pay freight to get steel has never been in doubt. How they actually go through the process of paying—is another thing. Mills in this area agree that they are going to be snowed under with trucks and requests to ship via water whenever possible. None of the producers are set up to handle any more trucking volume than they have already done. For the most part the mills are not yet equipped to quickly and efficiently load barges at an accelerated rate. Some mills have never permitted wide truck hauling out of their plants because of lack of space, no handling facilities and

the fact they had no control over the type and size of truck which might be sent to pick up an order.

Fortunately for producers, the switch to f.o.b. mill by the industry still allows a mill to decide how the tonnage will be hauled away, according to some observers. However, some consumers are already asking—does it?

ECA Names Deputy to Italy

Washington

• • • Leo Teplow, former assistant to Allis Chalmers Mfg. Co.'s vice-president in charge of public relations, has been named deputy for the Economic Cooperation Administration to Italy. Since 1945, Mr. Teplow has been director of industrial relations department of the National Assn. of Manufacturers.

Marshall Receives An Honorary A.S.M.E. Award

Washington

• • • Secretary of State George C. Marshall received a certificate of honorary membership in The American Society of Mechanical Engineers at an informal luncheon in his honor here at the Hotel Statler. President of the ASME E. G. Bailey, conferred the honor.

Secretary Marshall was cited by the society "for his distinguished services in military science and as Chief of Staff and General of the Army during World War II and as present Secretary of State."

The honorary membership was originally scheduled to be conferred last December during the society's annual meeting.

AMERICAN IRON AND STEEL INSTITUTE SHIPMENTS OF STEEL PRODUCTS ALL GRADES INCLUDING ALLOY AND STAINLESS (Net Tons)

MAY - 1948
Month

Steel Products	Number of companies	Items	Current Month			To Date This Year			Whole Year 1947		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale
			(Net Tons)	(Net Tons)	(Net Tons)	(Net Tons)	(Net Tons)	(Net Tons)	(Net Tons)	(Net Tons)	(Net Tons)
Ingot, blooms, billets, tube rounds, sheet and tin bars, etc.	43	1	254,926	4.8	280,363	*1,292,051	4.8	*1,331,119	2,966,748	4.7	2,396,343
Structural shapes (heavy)	12	2	361,732	6.8	1,773	1,704,610	6.4	12,868	4,436,129	7.0	2,640
Steel piling	4	3	22,494	0.4	-	121,850	0.5	8	324,224	0.5	23
Plates (sheared and universal)	29	4	563,110	10.6	32,502	2,789,713	10.4	160,321	6,345,216	10.1	219,227
Skelp	6	5	10,541	0.2	26,893	62,946	0.2	166,060	160,989	0.3	384,004
Rails—Standard (over 60 lbs.)	4	6	163,432	3.1	1,005	800,177	3.0	4,523	2,207,146	3.5	991
—All other	5	7	15,836	0.3	77	102,985	0.4	672	2,111,900	0.3	329
Joint bars	7	8	10,227	0.2	3,686	59,863	0.2	16,190	173,923	0.3	15,198
Tie plates	7	9	39,768	0.8	-	205,498	0.8	211	504,779	0.8	4,437
Track spikes	8	10	12,464	0.2	6	57,458	0.2	96	163,746	0.3	146
Hot Rolled Bars—Carbon	34	11	488,031	9.1	45,552	2,565,170	9.6	261,360	6,242,416	9.9	745,770
—Reinforcing—New billet	16	12	115,405	2.2	470	553,990	2.1	2,833	1,277,075	2.0	9,775
—Rerolled	13	13	20,902	0.4	-	81,392	0.3	-	175,833	0.3	-
—Alloy	27	14	152,919	2.9	19,064	782,332	2.9	96,249	1,741,432	2.8	212,382
—TOTAL	44	15	773,257	14.6	65,086	3,982,869	14.9	360,442	9,436,756	15.0	967,927
Cold Finished Bars—Carbon	27	16	93,105	1.8	698	552,336	2.1	2,214	1,426,701	2.3	9,249
—Alloy	26	17	17,800	0.3	441	89,182	0.3	2,005	218,802	0.3	2,601
—TOTAL	35	18	110,905	2.1	1,139	641,518	2.4	4,219	1,645,503	2.6	11,850
Tool steel bars	18	19	7,806	0.1	192	35,096	0.1	637	87,279	0.1	1,670
Pipe & Tubes—Butt weld	15	20	151,298	2.9	459	794,418	3.0	9,795	1,892,691	3.0	78,080
—Lap weld	8	21	26,589	0.5	-	144,790	0.5	3	389,762	0.6	875
—Electric weld	13	22	130,248	2.5	540	613,567	2.3	2,213	1,254,325	2.0	4,274
—Seamless	17	23	239,186	4.5	12,007	1,184,475	4.4	70,609	2,581,106	4.1	157,208
Wire rods	20	24	50,316	1.0	23,990	267,769	1.0	127,514	667,282	1.1	331,192
Wire—Drawn	39	25	223,192	4.2	15,510	1,120,745	4.2	75,383	2,590,963	4.1	181,783
—Nails and staples	17	26	69,037	1.3	973	359,579	1.3	6,038	799,436	1.3	8,481
—Barbed and twisted	15	27	21,874	0.4	2	110,579	0.4	50	256,991	0.4	128
—Woven wire fence	13	28	34,264	0.6	303	167,967	0.6	1,446	407,295	0.6	3,616
—Bale ties	11	29	10,533	0.2	-	50,471	0.2	-	119,917	0.2	-
Black Plate—Ordinary	9	30	65,059	1.2	-	325,146	1.2	562	801,745	1.3	2,033
—Chemically treated	2	31	1,893	-	-	6,340	-	-	19,252	-	-
Tin and Terne Plate—Hot dipped	8	32	172,610	3.2	20	828,789	3.1	119	2,093,149	3.3	228
—Electrolytic	9	33	149,688	2.8	-	710,657	2.7	215	1,617,659	2.6	529
Sheets—Hot rolled	32	34	624,865	11.7	51,208	3,188,585	11.9	271,368	7,891,798	12.5	578,426
—Cold rolled	16	35	555,288	10.4	1,329	2,758,187	10.3	8,310	5,504,578	8.7	28,498
—Galvanized	16	36	133,725	2.5	309	670,700	2.5	1,324	1,609,881	2.5	889
Strip—Hot rolled	23	37	126,896	2.4	22,844	681,727	2.6	144,336	1,740,085	2.7	308,655
—Cold rolled	33	38	141,960	2.7	2,294	721,976	2.7	10,271	1,613,005	2.6	28,030
Wheels (car, rolled steel)	5	39	28,586	0.5	170	134,004	0.5	525	356,873	0.6	2
Axles	5	40	17,770	0.3	8	83,026	0.3	83	185,019	0.3	53
All other	-	41	-	-	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	140	42	5,321,375	100.0	544,688	*26,779,909	100.0	*2,787,530	63,057,150	100.0	5,717,765

During 1947 the companies included above represented 99.5% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Adjusted.

Anti-Inflation Plan Fails; U. S. Steel Forced To Raise Wages, Prices

Pittsburgh

• • • Benjamin F. Fairless, president of United States Steel Corp., in announcing the granting to steel workers of a wage increase, averaging approximately 13¢ an hour, or about 9 pct, effective July 16, 1948, made the following statement.

"Last April U. S. Steel denied a wage increase to its steel workers and simultaneously reduced prices on many steel products which have a bearing upon the cost of living. These price reductions were made not because our steel prices were high or out of line in relation to costs, but rather in a sincere endeavor to aid in retarding further increases in the cost of living. U. S. Steel hoped this combined action on its part would prove to be a constructive step toward bringing to a halt the constant and dangerous spiral of higher wages and higher prices throughout the country and would result in greater national economic stability.

"Events of the past two months have demonstrated that the efforts of U. S. Steel in this direction have not been successful. Since April, industry after industry has granted substantial wage increases. During this period the prices of many products, other than steel, have continued to advance materially as a consequence of higher wages and higher production costs in general. Various other members of the steel industry did not follow this action of U. S. Steel and did not reduce their prices for similar steel products.

"In announcing its action last April, U. S. Steel stated that if its endeavor toward economic stabilization should fail and if costs should continue to advance, then in fairness to employees and to stockholders it would have to consider at some later date the adequacy of both its wages and steel prices under then-existing conditions.

"In keeping with this announced policy and mindful of the recent wage increases granted in other basic industries, U. S. Steel voluntarily reopened wage discussions with the United Steelworkers of America-CIO earlier this month. Desiring to treat employees fairly,

Increases Necessary To Cover Rise in Coal, Material And Freight Costs

the steel-producing subsidiaries of U. S. Steel have granted to their steel workers a wage increase of approximately 9 pct, or an average increase of about 13¢ per hour, effective July 16, 1948. These wage increases will range from 9½ to 25¢ per hour for different classes of employees. The present labor contracts between these subsidiaries and the union will be extended one year, from April 30, 1949, to April 30, 1950, with the right of reopening in July, 1949, for the purpose of negotiating wage rate changes and insurance benefits. Appropriate reservations in compliance with law will be made with respect to maintenance of membership in the extended contracts.

"These subsidiaries also propose to make appropriate adjustments as of July 16, 1948 in the salaries of other employees.

"U. S. Steel is greatly concerned over the ever-increasing cost of producing steel. It tried last April

to aid in halting these continuing increases in costs, but failed to accomplish its aim. Coal costs, which play an important part in the cost of producing steel, have recently increased substantially. Railroad freight rates have gone up four times since January 1, 1947. More than four tons of raw materials must be assembled to produce a single ton of steel, so transportation costs are of real importance in steel making. These four freight rate increases have added many millions of dollars to the freight charges on the 80 million tons of raw materials required annually by U. S. Steel. The continuing rise in the cost of purchased goods and services, which accounted for approximately 40 pct of U. S. Steel's expenditures in 1947, is a major problem for the steel producer. Scrap furnishes an illustration. The price of scrap today is at the high level of more than \$40 a ton.

"Past experience has established that a new national round of wage increases causes a rise in the cost of purchased goods and services in an equal or even greater dollar amount than the increase in our employment costs. Now follows a further very substantial direct increase in our employment costs as a result of the new wage and salary increases by our steel-producing subsidiaries, on top of the higher costs in our coal operations.

"U. S. Steel can only pay these increased production costs out of the money it receives from the sale of its products. These higher costs can be met only through increases in steel prices. U. S. Steel has no other alternative. In these days of great demand for steel and near full capacity operations, prices for steel should be adequate to cover all costs and earnings of the business. Last year the permit a fair return to the owner-profit of U. S. Steel was 6¢ per dollar of sales, the lowest for any peacetime year in its history when operations were at near capacity. Indications are that its earnings for the first six months of this year will prove to be somewhat less than for the same period in 1947.

"The steel-producing subsidiaries

(CONTINUED ON PAGE 142)

B. F. FAIRLESS: His anti-inflation plan fails.



U. S. Steel and Other Firms Name New F.O.B. Mill Prices on Steel

New York

• • • Steel prices shown below are f.o.b. mill prices for U. S. Steel Corp. and Bethlehem Steel Co. THE IRON AGE went to press before higher prices were announced by U. S. Steel and other steel firms. The prices below do not reflect the increases now in the process of being announced but they can be

used for comparison in order to determine the amount of increase on various products for those two companies. It was believed that the price increase by U. S. Steel would average about $\frac{1}{2}\phi$ a lb or \$10 a ton. Other steel companies which have gone f.o.b. mill include major steel firms. Others are going or will go to that basis as quickly as possible.

New York

• • • The following prices are for mills of Bethlehem Steel Co. The prices are f.o.b. mill in the sizes and shapes produced at those

points. Unless otherwise indicated the prices are in cents per lb. These quotations can be used for comparison when new higher prices are announced this week or next.

Pittsburgh

• • • Carnegie-Illinois Steel Corp., United States Steel subsidiary, in conformity with the change from the basing point method of selling, announced the following mill prices, at which its products within the range of sizes, grades, finishes and specifications produced may be purchased at its plants. Delivered prices reflecting actual transportation charges to destination will also be quoted. These prices will apply on carload lots and became effective with shipments made on or after 12:01 a.m., July 13, 1948:

SHIPPING PRICES AT ALL MILLS

(All figures cents per pound, unless otherwise noted)

CARBON STEEL

Ingots—forging	\$46.00 nt.
Blooms, billets & slabs—forging....	54.00 nt.
Blooms, billets & slabs—re-rolling..	45.00 nt.
Skelp	2.90
Bars & bar shapes	2.85
Hoop—tight cooperage	3.10
Floor plates	4.05
Plates	2.90
CB sections	2.70
Standard structural shapes	2.75
Concrete reinforcing bars (new billet)	2.70
Bearing piles (CBP sections)	2.70
Sheet piling	3.30
Standard Tee rails No. 1 O.H.....	2.70
Standard Tee rails No. 2 O.H.....	2.60
Standard Tee rails all No. 2 O.H....	2.65
Light rails	3.05
Joint bars and standard rails.....	3.75
Tie plates	3.55
Axles	4.45
Strip, hot rolled	2.75
Sheets, hot rolled—18 gage and heavier	2.75
Sheets, cold rolled	3.45
Sheets, electric (electrical grade)....	5.20
Sheets, galvanized	3.85
Sheets, galv. flat culvert—copper steel	4.45
Sheets, galvanized	4.40
Sheets, long terme, commercial quality	4.05
Sheets—vitrenamel	3.85
Roofing, short ternes 8 lb coated....	\$15.30 pkg.
Hollowware Enameling Black Plate...	4.65

HIGH STRENGTH STEEL

Corten	
Bars and small shapes	4.35
Plates	4.45
C.B. sections	4.20
Standard structural shapes	4.20
Strip hot rolled	4.20
Sheets hot rolled	4.20
Sheets cold rolled	5.20
Sheets galvanized	5.90
Man-Ten	
Bars and small shapes	3.65
Plates	3.95
C.B. sections	3.70
Standard structural shapes	3.70
Strip hot rolled	3.60
Sheets hot rolled	3.60
Abrasion Resisting	
Plates	4.05
Bars & bar shapes	3.80
Sheets hot rolled	3.90
Strip hot rolled	3.90

ALLOY

Ingots	\$56.00 gt.
Blooms, billets & slabs	66.00 gt.
Hot rolled bars	3.20
Bar shapes	3.45
Plates	3.70
Structural shapes	3.45
Strip hot rolled	4.60

(CONTINUED ON PAGE 124)

Billets, Blooms Slabs		
Carbon, re-rolling	\$45 nt	Lackawanna, Johnstown
Carbon, forging	54 nt	Johnstown
Alloy	66 gt	Lackawanna, Johnstown
Wire Rods 7/32 to 3/8 in.	2.80	Johnstown, 2.90 Sparrows Point
Sheets		
Hot-rolled, up to 72 in.	2.80	Lackawanna
up to 60 in.	2.80	Sparrows Point
Cold-rolled, lighter		
11 ga, up to 72 in.	3.55	Lackawanna
14 ga, up to 48 in.	3.55	Sparrows Point
Galv, 10 ga, up to 48 in.	3.95	Sparrows Point
Strip		
Hot-rolled	2.80	Lackawanna, Sparrows Point
Cold-rolled	3.55	Lackawanna, Sparrows Point
Bars		
Carbon steel	2.90	Lackawanna, Johnstown
Reinforcing, billet, to fabs, jobs.....	2.75	Lackawanna, Sparrows Point, Johnstown
Alloy, hot-rolled	3.30	Bethlehem, Lackawanna, Johnston
Alloy, cold-drawn	4.10	Lackawanna, Bethlehem
Plate		
Carbon steel, sheared, universal		
10 in. and over	2.95	Sparrows Point, Johnstown
Continuous mill	2.95	Lackawanna
Shapes, structural and wide flange.....	2.80	Bethlehem
Mfrs' bright wire	3.45	Johnstown, 3.55 Sparrows Point
High carbon spring wire	4.50	Johnston, 4.60 Sparrows Point, Williamsport
Piling, sheet steel	3.80	Lackawanna
Pipe and Tubing, standard t&c, extra		
strong, plain ends		
Buttweld, $\frac{1}{2}$ to 3 in. bl & galv.....	\$4 a ton higher than Pittsburgh area	
Lapweld, $3\frac{1}{2}$ to 6 in. bl & galv.....	mills.	
Lapweld, 8 to 12 in. bl & galv.....		
Mayari R		
Plates, sheared, universal 10 in. over...	4.55	Sparrows Point, Johnstown
Sheets		
Hot-rolled, up to 72 in.	4.30	Lackawanna
up to 60 in.	4.30	Sparrows Point
Cold-rolled, 13 ga & lighter		
up to 60 in.	5.30	Lackawanna
14 ga and lighter, up to 48 in.....	5.30	Sparrows Point
Galv 10 ga, up to 48 in.	6.00	Sparrows Point
Strip		
Hot-rolled	4.30	Lackawanna, Sparrows Point
Cold-rolled	5.30	Lackawanna, Sparrows Point
Shapes	4.30	Bethlehem
Beams	4.30	Lackawanna, Bethlehem
Bars and bar shapes	4.45	Lackawanna, Bethlehem, Johnstown
Merchant Wire Products		
Standard, coated, galv nails.....	93 col	Johnstown, Sparrows Point
Woven wire fence	97 col	Johnstown
Fence posts	105 col	Johnstown
Bale ties	96 col	Sparrows Point
Galv barbed, twisted barless wire.....	113 col	Johnstown, Sparrows Point
Annealed fence wire, 6 to 8 ga.....	4.10	Johnstown, 4.20 Sparrows Point
Annealed galv fencing 6 to 8 ga.....	4.55	Johnstown, 4.65 Sparrows Point
Joint bars, over 60 lb	3.75	Steelton, 3.85 Lackawanna
Rails, Track Supplies		
Cut spikes	4.85	Lebanon
Tie plates	3.55	Steelton, 3.65 Lackawanna

Murray Announces New Wage Agreement Signed With U. S. Steel

Pittsburgh

• • • Philip Murray, President of the CIO and the United Steelworkers of America, announced on July 16 that a wage accord had been reached with the United States Steel Corp. covering approximately 170,000 union members employed by the Steel Corporation and its subsidiaries.

Under the terms of the agreement concluded after more than 6 weeks of negotiations between Mr. Murray and executives of the Steel Corporation, a general wage increase average 13¢ an hr and ranging from 9½¢ to 25¢ for the different job classifications, was granted to the employees effective July 16.

The present contract between the steelworkers' union and the Corporation which expires Apr. 30, 1949, is extended until Apr. 30, 1950, with the right reserved to the union to reopen the contract on wages and social insurance in July 1949, with the right to strike on these subjects at that time.

The maintenance of union membership now granted in the present contract is reserved to the union until the termination of the present contract in April 1949, and its continuance thereafter will depend on the status of the law as it then exists covering union shop provisions, it being anticipated that by April of 1949 there will be a final court decision on this aspect of the law.

The wage agreement was ratified July 16 at a meeting of the union's wage policy committee which in a resolution hailed the agreement as "a great victory for the United Steelworkers of America recognizing as it does the union's just demands."

The wage policy committee likewise in its resolution congratulated President Murray "for his splendid leadership under which wages and working conditions of steelworkers have advanced to the point where steelworkers now stand in the forefront of American industrial workers."

New York

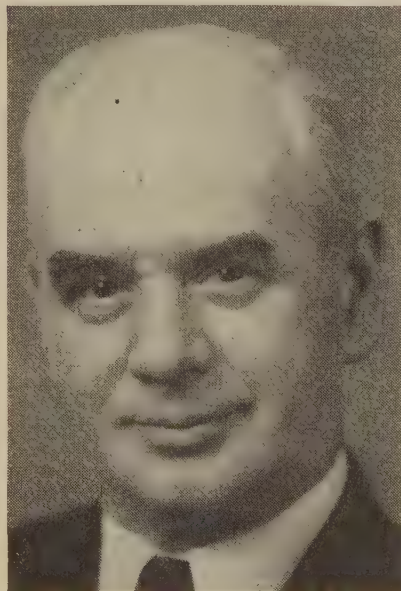
• • • Major steel companies have agreed to a wage pattern identical with that negotiated between the union and U. S. Steel. The excep-

About 170,000 Workmen To Get Pay Increases That Range From 9½ to 25c

o o o

tion was Weirton Steel Co., which signed a contract with an independent union which averaged 14¢ an hour and has a higher common labor rate.

Non-steelmaking fabricators will be negotiating new contracts soon.



PHILIP MURRAY: He finally got his steelworkers more money.

It is expected that the general pattern will be matched. Many smaller firms, however, had already closed their wage negotiations some time ago. Some of these contracts are expected to be reopened while others may stand pat. At least 400,000 steelworkers with fabricating and processing firms are still to get the green light on wage boost.

Social Security Deferred

Pittsburgh

• • • Not so far off was THE IRON AGE prediction that in addition to a good wage increase, the United Steelworkers of America would get a social security package. The union and the corporation, as part of the 1947 wage agreements, began a study of social insurance.

This year the corporation proposed a jointly paid program that would have cost 5¢ an employee hour. The union sought a plan paid solely by the corporation and would have cost slightly more than 9¢ an employee hour. As part of the wage increase announced last Friday, Philip Murray, president of the union, agreed to drop the insurance phase. But it will be reintroduced as part of the 1949 demands.

U. S. Steel Wage Raise Departs From Pattern Of Past Union Policy

New York

• • • The pay raise granted by U. S. Steel and which will be followed by other steel firms is the first of its kind in the past 10 years. All other pay boosts negotiated by steel firms and the United Steelworkers of America have been on a straight cents per hour basis. In the present case the raise was on a percentage basis—approximating 9.2 pct.

This means that higher paid workers will for the first time get more cents per hour than the lower grades. This departure from the union pattern was probably given plenty of thought before final acceptance. But the steel corporation had the final say because they opened the negotiations. At any rate steel workers this week are far happier than they were a month ago—and white-collar workers were whooping it up because of their increases—most of which they say will go for increased food and rent prices.

One happy aspect of the settlement which followed the Alcoa pattern was the continuation of the cordial relations between Ben Fairless and Phil Murray. Had they not had the relationship over the past 10 years the turn down on wage increase a few months ago might have left a scar. It came close to doing this very thing.

While the steel price increase was not announced when the steel wage boost came—that had been the original intention. In lieu of the actual price announcement came the statement that prices would be raised.

F.O.B. Mill Prices

(CONTINUED FROM PAGE 122)

San Francisco

• • • Columbia Steel Co. recently announced the following f.o.b. mill prices effective July 13:

(Prices in cents per lb unless otherwise indicated)

	Pitts- burg	Torr- ance
Structural shapes	\$3.35	
Tie plates	3.70	
Hot rolled bars	3.55	3.55
Concrete reinforcing bars.....	3.30	3.30
Hot rolled sheets—18 gage and heavier	3.45	3.45
Hot rolled annealed sheets—19 gage and lighter		4.55
Hot rolled drum sheets	3.45	3.45
Galvanized sheets	4.60	4.60
Galvanized culvert sheets	5.20	5.20
Hot rolled strip	3.50	3.50
Well casing sheets		4.25
Hot rolled rods	3.45	
Standard nails and staples.....Col. 112		
Non-standard nails and staples	5.60	
Annealed merchant wire	5.05	
Galvanized merchant wire	5.50	
Bright basic wire	4.40	
Annealed wire in stones.....	8.70	
Galvanized wire in stones.....	10.20	
MB spring wire	5.80	
Columbia spring wire	5.45	
Bright stapling wire	7.35	
Tire bead wire	10.30	
Barbed and twisted wire.....Col. 131		
Galvanized woven wire fence.....Col. 120		
Single loop bale ties.....Col. 118		

(Col. means column in price list)

Geneva, Utah

• • • Geneva Steel Co. recently announced the following f.o.b. mill prices effective July 13:

Structural shapes	\$2.75 per 100 lbs.
Carbon plates	2.90 per 100 lbs.
Corten plates	4.45 per 100 lbs.
Manten plates	3.90 per 100 lbs.
Pig iron, foundry grade.....	40.50 per gross ton

Birmingham, Ala.

• • • Tennessee Coal, Iron and

Railroad Co. f.o.b. mill prices follow:

(Cents per lb unless otherwise indicated)

	Ensley	Fairfield
Rerolling billets, blooms and slabs	\$45.00 nt	\$45.00 nt
Forging billets, blooms and slabs	54.00 nt	54.00 nt
Wire rods		2.80
Hot rolled sheets 18 ga. and heavier		2.75
Hot rolled annealed sheets 19 ga. and lighter		3.65
Cold reduced sheets.....		3.45
Galvanized sheets.....		3.85
Standard rails	2.70	
Light rails	3.05	3.05
	Bessemer	Fairfield
Hot rolled strip	2.75	2.75
Bars and small shapes....	2.85	2.85
Reinforcing bars		2.70
Plates, carbon	2.90	2.90
Standard structural shapes	2.75	2.75
Tennessee special tool steel	9.50	
Splice bars		3.75
Tie plates		3.55
Track spikes		4.85
Axles		4.45
	Cor-Ten	
Hot rolled sheets		4.20
Hot rolled strip	4.20	4.20
Bars and small shapes....	4.35	4.35
Plates	4.45	4.45
Standard structural shapes	4.20	4.20
	Wire Mill Products	Fairfield
Bright low carbon wire		3.45
Nails and staples		Col. 91
Wire, merchant quality:		
1. Annealed		4.10
2. Galvanized		4.55
Barbed wire		Col. III
Woven fence		Col. 97

(Col. refers to column in price lists)

Pittsburgh

• • • National Tube Co.'s prices apply at the following points of production:

Buttweld standard and line pipe—Lorain, Ohio.
Seamless standard and line pipe and large O.D. pipe—Lorain, Ohio, with some production at our option at McKeesport, Pa.

Seamless casing, drill pipe, and N-80 tubing—McKeesport, Pa., with some production at our option at Lorain, Ohio.
Seamless oil well tubing grades J-55 and H-40—Lorain, Ohio.
Seamless hot-rolled and cold-drawn pressure and mechanical tubing, carbon and alloy—Ellwood City, with incidental production at our option at Gary, Ind.

Cleveland

• • • American Steel & Wire Co. f.o.b. mill prices follow. They reflect no change from present basing point prices, with the exception of the Worcester, Mass. district where differentials have been increased slightly, and in Duluth, Minn., where existing differentials have been eliminated.

	Cents per Pound	
WIRE RODS, CARBON		
Donora, Cleveland and Joliet.....	2.80	
Worcester	3.10	
COLD ROLLED CARBON STRIP		
Cleveland	3.45	
New Haven	3.95	
COLD FINISHED CARBON BARS		
Waukegan, Cleveland and Donora.....	3.45	
COLD ROLLED ALLOY STRIP		
Cleveland	9.35	
Worcester	9.65	
COLD FINISHED ALLOY BARS		
Waukegan, Cleveland and Donora.....	4.00	
Worcester	4.30	
HOT ROLLED ALLOY RODS		
Cleveland, Joliet and Donora.....	3.20	
Worcester	3.50	
COLD ROLLED STRIP— HI STRENGTH (CORTEN)		
Cleveland	5.00	
WIRE—MFGS. BRIGHT, LOW CARBON		
Joliet, Waukegan, Cleveland, Donora, Duluth and Rankin	3.45	
Worcester	3.75	
SPRING WIRE—HIGH CARBON		
Waukegan, Cleveland, Donora and Duluth	4.50	
Worcester, Trenton and New Haven....	4.80	
FLAT WIRE		
Cleveland	4.45	
Worcester	4.75	
NAILS AND STAPLES		
Donora, Joliet, Rankin and Duluth..	Col. 91	
Worcester	Col. 97	
WIRE—MERCHANT QUALITY		
	An- nealed	Gal- vanized
Cleveland, Donora, Joliet		
Rankin and Duluth	4.10	4.55
Worcester	4.40	4.85
WIRE—BARBED		
Donora, Rankin, Joliet and Duluth....	Col. 111	
WOVEN FENCE		
Donora, Joliet, Rankin and Duluth....	Col. 97	
BALE TIES		
Donora, Joliet and Duluth.....	Col. 94	
FENCE POSTS		
Duluth	Col. 104	

(Col. refers to column in price lists)

(Col. refers to column in price lists)

Coming Events

- July 26-27 Institute of Scrap Iron & Steel, midyear meeting, Atlantic City.
Aug. 30-Sept. 3 American Chemical Society, national meeting, Washington.
Sept. 6-10 American Chemical Society, national meeting, St. Louis.
Sept. 13-17 American Chemical Society, national meeting, Portland, Ore.
Sept. 13-17 Instrument Society of America, conference and exhibit, Philadelphia.
Sept. 28-Oct. 1 Assn. of Iron & Steel Engineers, Convention and Iron and Steel Exposition, Cleveland.
Oct. 5-7 Industrial Packaging Engineers Assn., Industrial Packaging and Materials Handling Exposition, Chicago.
Oct. 5-9 Concrete Reinforcing Steel Institute, semiannual meeting, Asheville, N. C.
Oct. 11-13 National Lubricating Grease Institute, annual convention, Chicago.
Oct. 13-15 Porcelain Enamel Institute, annual forum, Urbana, Ill.
Oct. 24-29 American Welding Society, annual meeting, Philadelphia.

To Produce Clad Plate

Claymont, Del.

• • • Jessop Steel Co. and Worth Steel Co. have entered into a working agreement for large scale production of stainless clad plate and flanged or flanged and dished heads to be sold under name of Ferro Bond.

This material will be produced following the patented Armstrong process. Clad plate produced by this method has been commercially available longer than that produced by any other method.

Buys Shop To Pour Ingots

Braddock, Pa.

• • • Members of the Frozen Food Institute have purchased Sterling Steel Foundry Co. here to make carbon steel ingots for conversion, according to Dr. G. Hodges Bryant, chairman of the institute. Dr. Bryant, who is now president and general manager of the foundry opera-

tion too, said that Loftus Engineering Co., Pittsburgh, had been retained to convert two 35-ton acid openhearth into 40-ton basic furnaces. Loftus will also build a new 50-ton basic openhearth on the site.

Arrangements for purchase of the foundry and converting it were made by John Lear of John P. Ludgate Associates, Pittsburgh and O. W. Harrington, Baltimore. With

3-shift operation, the management expects that capacity of the converted furnaces will total 6000 tons monthly while the new furnace will add another 3000 tons. Conversion of ingots will be handled with mills by individual members of the institute, Dr. Bryant said. Headquarters of the Frozen Food Institute, which has 750 members, are at 90 W. Broadway, New York.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1948

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January.....	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.43
February.....	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
March.....	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st Quarter.....	19,855,413	95.5	1,047,000	80.6	1,118,702	83.4	22,021,115	94.0	1,693,932	13.00
April.....	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
* May.....	6,799,289	96.0	355,562	80.3	404,821	88.5	7,559,672	94.7	1,706,472	4.43
† June.....	6,489,764	94.6	356,810	83.2	409,931	92.6	7,256,505	93.8	1,691,493	4.29
† 2nd Quarter.....	18,933,210	91.0	897,461	69.0	1,208,617	90.0	21,039,288	89.7	1,617,163	13.01
† 1st 6 months.....	38,788,623	93.2	1,944,461	74.8	2,327,319	86.7	43,060,403	91.8	1,655,533	26.01
July.....										4.42
August.....										4.43
September.....										4.29

* Revised.

† Preliminary figures, subject to revision.

PRINTED IN U.S.A.

YEAR 1947

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January.....	6,550,058	95.2	384,096	87.7	288,458	66.9	7,222,612	93.2	1,630,386	4.43
February.....	5,835,018	93.9	314,912	79.6	280,471	72.0	6,430,401	91.9	1,607,600	4.00
March.....	6,619,641	96.2	378,893	86.5	318,440	73.8	7,316,974	94.4	1,651,687	4.43
1st Quarter.....	19,004,717	95.1	1,077,901	84.8	887,369	70.9	20,969,987	93.2	1,630,637	12.86
April.....	6,365,670	95.5	375,675	88.6	310,497	74.3	7,051,842	93.9	1,643,786	4.29
May.....	6,640,004	96.5	372,878	85.2	326,132	75.6	7,339,014	94.7	1,656,662	4.43
June.....	6,317,705	94.8	351,247	82.8	308,762	73.9	6,977,714	92.9	1,626,507	4.29
2nd Quarter.....	19,323,379	95.6	1,099,800	85.5	945,391	74.6	21,368,570	93.9	1,642,473	13.01
1st 6 Months.....	38,328,096	95.4	2,177,701	85.2	1,832,760	72.8	42,338,557	93.5	1,636,589	25.87
July.....	6,033,512	87.9	256,125	58.6	289,048	67.2	6,578,685	85.1	1,488,390	4.42
August.....	6,329,497	92.0	346,033	79.0	315,622	73.2	6,991,152	90.2	1,578,138	4.43
September.....	6,152,348	92.5	334,425	79.0	310,684	74.6	6,797,457	90.8	1,588,191	4.28
3rd Quarter.....	18,515,357	90.8	936,583	72.2	915,354	71.6	20,367,294	88.6	1,551,203	13.13
9 Months.....	56,843,453	93.8	3,114,284	80.8	2,748,114	72.4	62,705,851	91.9	1,607,842	39.00
October.....	6,831,984	99.3	384,272	87.8	353,896	82.1	7,570,152	97.7	1,708,838	4.43
November.....	6,543,390	98.2	360,620	85.0	338,417	81.0	7,242,427	96.5	1,688,211	4.29
December.....	6,654,966	96.9	373,367	85.5	347,308	80.7	7,375,641	95.4	1,668,697	4.42
4th Quarter.....	20,030,340	98.1	1,118,259	86.1	1,039,621	81.3	22,188,220	96.5	1,688,601	13.14
2nd 6 months.....	38,545,697	94.4	2,054,842	79.1	1,954,975	76.4	42,555,514	92.6	1,619,928	26.27
Total.....	76,873,793	94.9	4,232,543	82.1	3,787,735	74.6	84,894,071	93.0	1,628,195	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons Bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of January 1, 1947 as follows: Open hearth 81,010,990 net tons, Bessemer 5,154,000 net tons, Electric 5,076,240 net tons, total 91,241,230 net tons.

Industrial Briefs . . .

• **ACQUISITION** — American Roller Die Corp., Cleveland, has announced the acquisition of patents and sales rights for Tool & Mfg. Co. The machines merly held by the McKinney will be marketed under the former McKinney Tool's name bearing the American Roller Die "Ardcor" trade name.

• **ELECTS OFFICERS** — Charles F. Bannan, vice-president, Pacific Gear & Tool Works, San Francisco, was elected president of the California Metal Trades Assn. succeeding Joseph Moore, Jr. Also elected was Cloyd Gray, president, W. R. Ames Co., San Francisco, as vice-president.

• **OPENS NEW BRANCH** — The Big Three Welding Equipment Co. of Houston and Fort Worth, Tex. have recently announced the opening of a new branch in Lubbock, Tex., offering complete selling and service facilities for welders, electrodes, gas welding equipment and welding accessories.

• **SILICONE PLANT** — A new multimillion dollar chemical plant for the manufacture of silicone materials has been completed at Waterford, N. Y., by the Chemical Dept., General Electric Co., it was announced recently. In partial operation for about a year, the new plant is now ready to produce the war-developed materials at full capacity.

• **OHIO AGENT** — Fort Duquesne Steel Co., Pittsburgh, processors and distributors of flat-rolled steel products has appointed Homer L. Ruh, 1811 Guilford Road, Columbus, Ohio, as its district sales representative in Columbus, Springfield and the surrounding area.

• **MOVES** — Rite-O Tool & Gage Co. has announced that they are now occupying their new building at 321 West Ten Mile Road in Hazel Park, Mich.

• **REPRESENTATIVES** — The L. G. S. Spring Clutch Corp., subsidiary of Curtiss-Wright Corp., Indianapolis, has announced the appointment of sales representatives in two districts; Frank W. Yarline & Co., 20 North Wacker Drive in the Chicago area and Gregg & Spohn, 626 Broadway in Cincinnati.

• **PURCHASES PLANT** — Lima-Hamilton Corp. has purchased the government-owned portion of the Lima Tank Arsenal, Lima, Ohio, for \$303,372, according to War Assets Administration. The corporation plans to manufacture cranes, draglines and heavy shovels in the facility. The sale is subject to the National Security Clause.

• **TRUCK BODY GROUP** — The National Truck Body Manufacturers' Assn. has recently received its charter from the State of Indiana. Over 150 large and small commercial truck body manufacturers are members of the new association. Frank E. Hartnell, Transportation Specialties, Elkhart, Ind., will serve as president.

• **BUILDING LABS** — Construction has been started on a new building to house the metallurgical, physical and chemical laboratories of Edward Valves, Inc., East Chicago, Ind., a subsidiary of the Rockwell Mfg. Co.

• **WAA SALE** — The War Assets Administration has announced the sale of the east and south yards of the surplus New England Shipbuilding Corp. facilities to the Dinger Construction Co., Staten Island, N. Y., for \$890,000.

• **TAKES OVER** — Kearney & Trecker Corp., Milwaukee, builders of machine tools, has purchased the Walker-Turner Co., Inc., Plainfield, N. J., manufacturers of light machine tools.

Construction Steel . .

• • • Fabricated steel awards this week included the following:

- 3200 Tons, Richmond, Va., alterations to the Richmond viaduct, for the C. & O. R.R. Co. to Carnegie Illinois Steel Corp., Pittsburgh.
- 2215 Tons, Wenatchee, Wash., bridge across highway PSH No. 2, through General Construction Co., Seattle, to Columbia Steel Co., San Francisco, Calif.
- 1400 Tons, Philadelphia, Vine St. bridge, Pennsylvania Dept. of Highways, through Golder Construction Co., Philadelphia, to American Bridge Co., Pittsburgh.
- 600 Tons, Syracuse, N. Y., Syracuse Housing Project No. 35, to American Bridge Co., Pittsburgh.
- 580 Tons, Birmingham, highway overpass, Federal Aid Project UGI-280 (3), to Virginia Bridge Co., Birmingham.

• • • Fabricated steel inquiries this week included the following:

- 8700 Tons, Boston, elevated express highway, State Highway Dept.
- 4500 Tons, Milwaukee, stock house and fermentation building for Schlitz Brewing Co.
- 4000 Tons, St. Albans, L. I., N. Y., Naval Hospital for U. S. Bureau of Yards & Docks.
- 4000 Tons, Derby, Conn., Housatonic River Bridge through State Highway Dept.
- 236 Tons, Delaware County, Pa., bridge, Route 225, Pennsylvania Dept. of Highways, due July 30.
- 680 Tons, Los Angeles, Firestone Blvd. bridge construction, in South Gate, Los Angeles District Corps of Engineers, Spec. Eng-04-353-49-1, bids to Aug. 10.

• • • Reinforcing bar awards this week included the following:

- 505 Tons, Wenatchee, Wash., bridge across highway PSH No. 2, through General Construction Co., Seattle, to Columbia Steel Co., San Francisco, Calif.
- 170 Tons, Chicago, Home for Aged Jews, to the Morris Handler Co., contractor.
- 160 Tons, Whiting, Ind., school building for St. John the Baptist, to Roy C. Clark, East Chicago, Ind.

• • • Reinforcing bar inquiries this week included the following:

- 370 Tons, Urbana, Ill., staff building for the University of Illinois, John Selmley Co., low bidder.
- 190 Tons, Los Angeles, Firestone Blvd. bridge construction and river channel improvement in South Gate, Los Angeles District Corps of Engineers, Spec. Eng-04-353-49-1, bids to Aug. 10.
- 135 Tons Paonia, Colo., Spring Creek Dam, Bureau of Reclamation, Paonia, Spec. 2316, bids to Aug. 3.

Furnace Hits Milestone

Oakland, Calif.

• • • Tapping the 2 millionth ton of iron from the blast furnace at the Kaiser Steel Fontana plant marked another milestone in the company's western industrial expansion.

The furnace was blown in on Dec. 30, 1942, after 8 months of work on its construction. Built for a capacity of 1200 tons a day, the furnace is currently averaging 1220 tons daily to feed the plant's 6 openhearth furnaces.

Production for the openhearth exceeds 2500 ingot tons a day.

Weekly Gallup Polls . . .

See Major Parties Equally Capable Of Handling Problems

Princeton, N. J.

• • • American voters today place almost equal confidence in the ability of the two major parties to solve the nation's most important problem. This is in contrast to the attitude of voters prior to the 1944 election when a substantial majority had greater faith in the Democratic Party to handle both domestic and foreign affairs, according to George Gallup, director, American Institute of Public Opinion.

When representative voters throughout the nation were asked by the institute to name the country's most serious problem they named foreign policy first followed by the high cost of living, strikes and labor problems, and housing.

The same voters were then asked which party they felt could best handle that particular problem. Eliminating all votes except those which named one of the two major parties, the voting goes this way:

	Pct
Democratic Party	52
Republican Party	48

Elections are usually decided on the basis of two considerations; first, voter appraisal of the merits of the candidate; and, second, voters' convictions on which party can do the best job handling major problems of the day.

On the last point, it is enlightening to compare the current figures with results of a survey prior to the 1944 presidential election and a similar poll for the 1946 congressional election:

1944	Pct
Democratic Party	55
Republican Party	45

1946	Pct
Democrat Party	40
Republican Party	60

In the 1946 election the Republicans captured control of both the Senate and the House.

The fact that there is very little difference in the confidence that voters place in the two parties provides further evidence that the election this year will likely hinge to a great degree on how voters appraise the candidates themselves.

Voters give the nod to the Dem-

ocrats when it comes to keeping reins on the high cost of living, but believe the Republicans can do a better job handling our relations with foreign countries. This is shown in the following table:

FOREIGN POLICY		Pct
Democratic Party		48
Republican Party		52
HIGH COST OF LIVING		Pct
Democratic Party		55
Republican Party		45

To test sentiment on what constitutes America's major problem today, voters were asked:

"What do you think is the most important problem facing this country today?"

The answers:

	Pct
Foreign policy	44
High cost of living.....	23
Domestic policies; presidential election; education, racial problems....	9
Strikes, labor problems.....	5
Housing	4
Communism at home and abroad.....	4
Preparedness, army and navy.....	3
Miscellaneous	5
Don't know	4

*101 pct

*Totals to more than 100 pct because some respondents gave more than one answer.

• • • Although the Republican platform adopted at Philadelphia won a good deal of favorable comment in the press, comparatively few voters have thus far read any part of it or can remember what is in it.

Throughout the voting population as a whole 77 pct claim to have read all of it and 21 pct say they have read some part of it, making a total of 28 pct—or less than one voter in three. Among Republicans the ratio who have read all or part of the GOP platform is a little higher—35 pct.

But important parts of the platform apparently did not leave much impression even on those who took the trouble to inspect the document.

It is possible, of course, that the idea in the GOP platform will be given wider circulation and will penetrate deeper into the minds of voters ahead. But so far the platform has not made as much progress, in terms of penetration, as

Few Voters Familiar With Provisions In Republican Platform, Survey Reveals

o o o

did the 1944 GOP platform at a comparable point in the campaign. Three weeks after the 1944 Republican convention, the institute found that 36 pct of all voters had read some or all of the platform. In 1940 the readership was 26 pct.

From this record it would appear that the majority of American voters do not put much stock in presidential party platforms, being suspicious perhaps that they contain much vague double talk promising all things to all groups.

A national cross-section of voters was asked a series of questions about the Republican platform, as follows:

"Did you happen to read the Republican party platform drawn up at their convention in Philadelphia?"

The vote:

	All Voters Pct	GOP.. Voters Pct
Yes, all of it.....	7	12
Yes, only part of it.....	21	23
No, not any of it.....	72	65

The 28 pct who voted "yes" were then asked a series of questions about various parts of the platform, as follows:

"Will you tell me what the platform says about the part the U. S. should play in world affairs?"

	Pct
Don't know	12
Should take part, no more isolationism	7
Favor aid to Europe.....	5
Peace, unity, understanding.....	2
U.S. be firm, keep Russia in place.....	1

*29 pct

(*Totals more than 28 pct because some named more than one item.)

"Will you tell me what it says about housing?"

	Pct
Don't know	15
Get more houses	7
E courage better homes at less cost.....	1
Private financing best	1
Federal aid for slum clearance.....	1
Miscellaneous	3

28 pct

Reports Show 15 Pct Increase in New Firm Orders for June

• • • New firm orders for machine tools in June were up considerably over May, perhaps as much as 15 pct, despite the fact that business tapered off during the last week of the month, according to preliminary reports.

Sources in the trade predict that shipments of machine tools will show an increase of 10 pct over May, when complete data are available.

New foreign firm orders are also expected to show an increase, possibly 10 pct over May.

On the other hand, it is believed that June cancellations will be about double the May total, due in part to the steel shortage which will certainly not be alleviated within the limit of delivery of some of the heavier machines.

Price adjustments are beginning to seep through, and the new steel prices will probably bring forth more, not because of the size of the steel price increases, but because productivity in many machine tool shops is at such a low ebb that additional costs cannot be absorbed. And although the machine tool business has been quiet during July, some segments of the industry are not likely to let this stand in the way.

In many segments of the industry, backlogs have undergone a wholesale reduction. One producer, for example, had a backlog of 900 machines when the war ended, a backlog of 70 just prior to the machine tool show about a year ago and has a backlog of 140 at the present time.

This could also be taken as evidence of the slowness of government business stemming from the rearmament program in reaching some machine tool builders. The Aircraft Industries Assn. has estimated that the authorized peak production rate of military aircraft will be reached some 18 months or 2 years hence, because of the "current boom in the domestic economy." Industrial capacity in the aircraft industry itself is sufficient for the new program AIA notes,

but capacity in industries which must supply the aircraft industry with much of its parts and accessories is heavily engaged in civilian production.

At the moment, the most promising facet of the entire program, so far as the machine tool industry is concerned, is the jet program, for which a reported \$300 million has been set aside. At the same time, there are reports that jet blades can be cast by a new and secret process to a tolerance of a few thousandths, requiring a minimum of machining.

In Detroit tools for Reo Motors' modernization program at Lansing are expected to be all ordered within the next 30 to 60 days. This large program was recently expanded. The company will shortly be in production on their new trucks which are powered by a new engine.

Cadillac's completely new engine for the car which is still in design stages may not require any new tools to speak of. If anything, machine tool experts here expect that the most this particular project will require are new fixtures. The Cadillac plant very recently installed the last of a large number of ultra-modern machine tool equipment, all of which can be adapted to the production of the new engine.

Last week saw a price increase here in one line of grinders to about 10 pct. Notices have been issued by the makers of Baker equipment and the price on these lines will be advanced Aug. 1. The extent of the increase will be based on labor settlements now being negotiated.

Generally things are quiet. The tool and die shop strike has slowed down inquiries. Kaiser-Frazer, who had previously canceled some tooling, is back in the market again. This program is not large and is mostly tool room equipment.

In Chicago, Sundstrand Machine Tool Co., Rockford, Ill., wartime operator and present lessee of the surplus industrial plant at 2400

South 11th St., Rockland, submitted a bid of \$702,266.90 for its purchase of War Assets Administration. No other offers were received, it was reported.

The plant contains 117,000 sq ft of floor space in two major buildings and approximately 6500 sq ft of floor space in four minor structures. It is being used for the manufacture and assembly of hydraulic transmission pumps and valves at the present time.

Hugo L. Olson, president of Sundstrand, said no change in production or personnel is contemplated if the bid is accepted.

Sundstrand's offer was taken under advisement by the WAA real property office which expects to announce a decision within the next week.

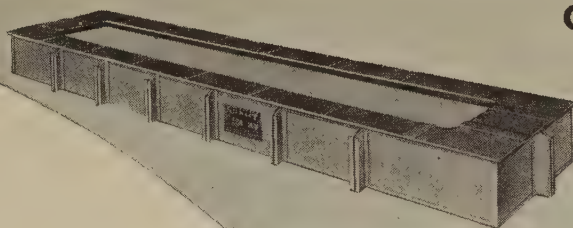
In Sidney, Ohio, announcement was made last week by Monarch Machine Tool Co. of the completion of its 25,000th lathe to be built with flame hardened and ground bed ways. The machine, a 14 x 54 in. engine lathe, has been delivered to the B. F. Goodrich Co., Akron.

Propose Government-Owned Machine Tools Be Allocated To ERP

French Lick, Ind.

• • • A proposal that all government-owned machine tools as well as surplus tools in the hands of industry be allocated to the European Recovery Program was made at the recent convention of the convention of the Machinery Dealers National Assn. here. The proposal was made by Charles A. Simmons of the Simmons Machine Tool Co., Albany, who estimated that there were 150,000 government-owned machine tools idle in this country including some 90,000 allocated to the Joint Army and Navy Machine and Tool Program, together with some 50,000 used tools released every year by industrial plants.

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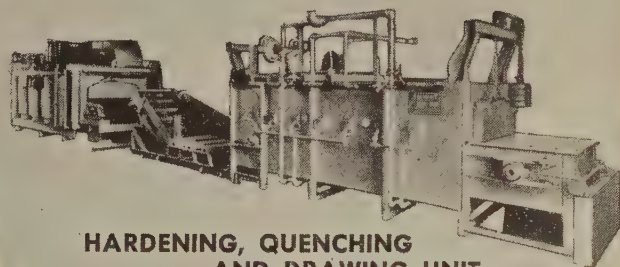
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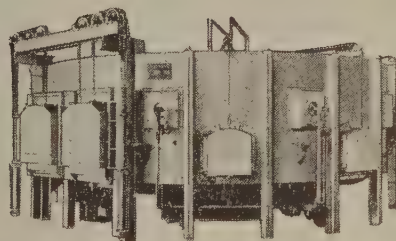
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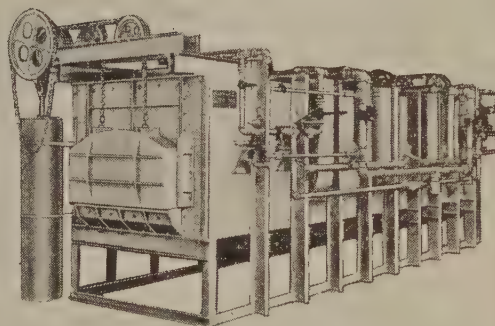
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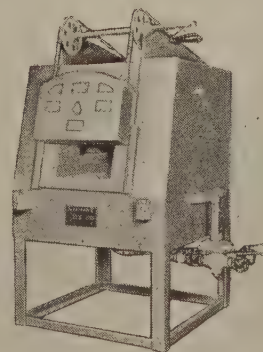
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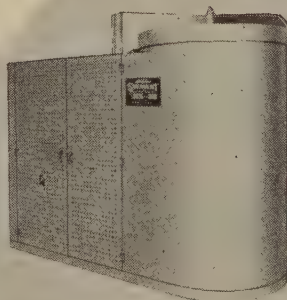
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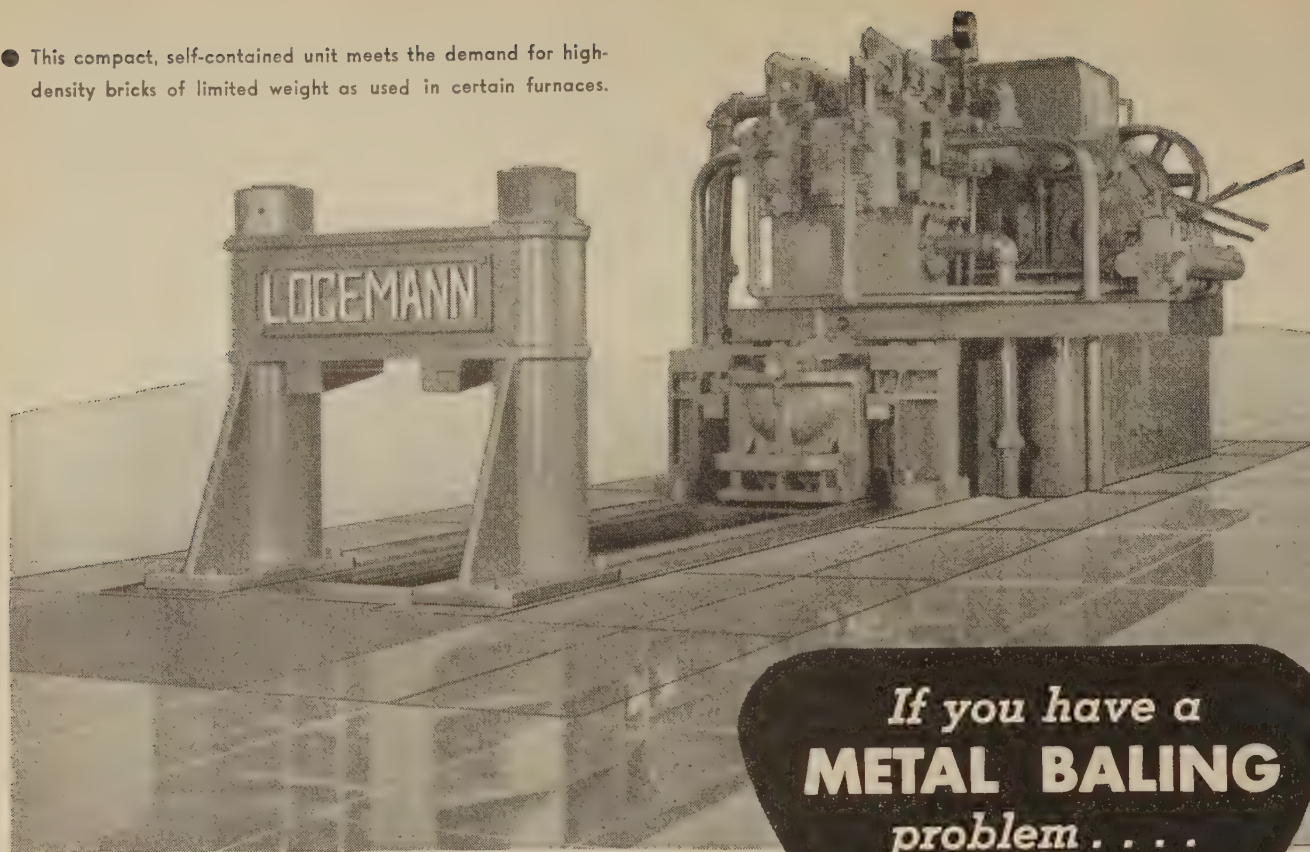
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meet your requirements. Write today for further information. Tell us the nature of your scrap and the tonnage desired . . . we'll do the rest!

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Chicago Hits New High; Others Still Hold

New York

• • The Chicago market has dropped the formula figure of \$39.50 completely this week with some mills admitting that old orders are being covered by brokers at much higher prices. The listing this week is \$41.00 to \$41.50, a 50¢ increase in the top figure and an increase in the average of \$1 over last week's price which was apparently only a temporary levelling-off due to consumer resistance.

The Chicago market is by all means stronger than it has been at any time since last year, with the railroad lists reflecting the strength and closing higher on all items. The market for cast grades there is also stronger than it has been for some months.

Pittsburgh, Cleveland and Valley consumers continue to cling to the formula, but the pressure persists and on out-of-district buying the prices have been pushed up as much as \$2 over the formula in many instances. Reduced production due to the coal cutback is helping slightly in the mills' stand. Some observers fear that considerable material is being withheld in anticipation of an upward move. Reflecting this, dealers are having private price wars in their efforts to get peddler scrap.

There is a general reluctance to accept orders until the situation settles down, as those markets which are still holding the line are likely to break through the minute any major consumer comes in with higher priced orders. Railroad lists may well touch off the fireworks officially, according to observers.

In the face of scarcity a major consumer, Carnegie-Illinois Steel Corp., brought low quality shipments into the spotlight again. In letter to the trade, the company pointed out that scrap quality, particularly in bundled material, is becoming increasingly serious and is actually responsible for a loss in steel production.

PITTSBURGH—Though no prices changed during the past week the strong undertone persisted. At least one large buyer has jumped his out-of-district

buying price by \$2 over the formula. Local prices hold, but dealers are having a private price war to get peddler scrap, apparently hoping for an upward move. Production cuts due to the coal shortage have increased some local mill stocks. Bundle quality was criticized by Carnegie-Illinois Steel Corp. in a recent letter to dealers and brokers. The bundler's name will hereafter be furnished by suppliers or the car will be held and demurrage charged to the suppliers account.

CHICAGO—Last week the formula lost all semblance of being a fact. For weeks it has existed mostly in theory. Some mills admit they can no longer even mention the old formula to brokers. Ton-nages moving at the old price have dropped to the point where \$39.50 can no longer be considered a representative figure. Mills admit old orders are being covered by brokers at prices much higher than \$39.50. Last week's price appeared to establish but a momentary pause in the strongest market seen here since last year. Scrap buyers are combing Indiana points offering you Chicago mills a \$41.50 price, based at Kokomo. Scrap from this area will deliver into Chicago around \$43.00 depending on shipping point. Railroad lists closed higher on all items. Cast scrap is stronger than it has been in months. Some observers say the railroads may decide to sell scrap at its location making the mills pay the full freight into this area. They point out steel established this selling method and it is not unlikely the railroad may follow.

PHILADELPHIA—The market here is quiet due largely to vacations but a strong undertone prevails. There were no price changes in steel grades last week, but cast grades are easier and the market for foundry grades is down \$1 to \$2 a ton. Some buyers expect to be able to find lower cast prices at the end of the month and are not offering large orders. Dealers from all over the country were represented at the sale of the old Janson rolling mill in Columbia. Scrap, mostly shafting, to the extent of 1000 tons is reported to have sold at an average price of \$60 a ton.

CLEVELAND—The law of supply and demand as it applies to the scrap market is undergoing the supreme test. Shipments are off badly here and in the Valley, brokers are cleaning up on their old orders, and there is a general reluctance to take any new paper at the formula. Only material moving in any quantity is earmarked. There is some inclination to hold openhearth material for higher prices. Conditions are ideal for a rise in the market, but it is entirely possible that the present chaos may continue for a couple of weeks, possibly until the first week of August, when some of the railroad lists may officially kick over the ap-plecart.

DETROIT—The formula has soured. Some admit they were forced to throw it out, others maintain they will stick to it no matter how bad it smells. One thing for sure is that brokers have had to pay \$38.00 to \$38.50 on track to get scrap. Whether they have a place to go with it is not in doubt. Whether they lose money is another thing. One mill admits they haven't bought for three weeks and don't know what they can buy for. Another mill insists they bought last week at formula price. It is unlikely that scrap brokers will subsidize a mill price for very long. Cast scrap remained steady.

BUFFALO—Leading local consumers of steel scrap adhered to the formula last week in spite of the tightness which forced brokers and dealers to pay over-schedule prices to complete orders. The apparent "victims" scoffered at whispers that they were the recipients of compensating mill favors. Meantime the race for available supplies got hotter and it was suggested that some steel users were competing in the open market for scrap to deliver on reciprocal trades. At Syracuse three or four Pittsburgh area consumers were buying No. 2 steel at \$38 f.o.b. cars, equivalent at \$42.25 Buffalo and over \$45 Pittsburgh. An Ohio mill was offering \$43.50 Buffalo for No. 1 hvy melting, but that price was below the market of \$44 to \$45.

BIRMINGHAM—Despite a strong undertone, scrap in this market still is being sold at formula prices. Accumulations on dealers' yards are at the lowest level in months. Very little material is moving out of the district to mills in other areas.

NEW YORK — Movements continue about the same—no better and no worse. But the undercurrent in the market is terrific and some observers expect price changes next week. There is a lot of bulling talk in cast grades, but with most of the local foundries on vacation and out of the market, at least the bull market, prices remain unchanged.

CINCINNATI—Openhearth grades are clinging to the formula and continuing to move to consumers, but not in any great quantity. Signs of sympathetic strength are showing up in this market as the result of activity in other districts, and dealers are inclined to offer very little material in anticipation of higher prices.

BOSTON—a combination of hot weather, brokers' vacations and industrial vacations brought business virtually were no new price developments.

ST. LOUIS—Steel mills are still holding to the formula for No. 2 heavy melting steel and related items although there is some speculative buying at higher prices by others.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$40.00 to \$40.50
RR. hvy. melting.....	41.00 to 41.50
No. 2 hvy. melting.....	40.00 to 40.50
RR. scrap rails.....	56.00 to 57.00
Rails 2 ft and under.....	62.50 to 63.50
No. 1 comp'd bundles.....	40.00 to 40.50
Hand bld. new shts.....	40.00 to 40.50
Hvy. axle turn.....	41.50 to 42.00
Hvy. steel forge turn.....	41.50 to 42.00
Mach. shop turn.....	35.50 to 36.00
Shoveling turn.....	38.00 to 38.50
Mixed bor. and turn.....	35.50 to 36.00
Cast iron boring.....	38.00 to 38.50
No. 1 cupola cast.....	63.00 to 64.50
Hvy. breakable cast.....	52.00 to 53.00
Malleable.....	76.00 to 77.00
RR. knuck. and cup.....	56.00 to 57.00
RR. coil springs.....	56.00 to 57.00
R.R. leaf springs.....	56.00 to 57.00
Rooled steel wheels.....	56.00 to 57.00
Low phos.....	48.50 to 49.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$41.00 to \$41.50
No. 2 hvy. melting.....	41.00 to 41.50
No. 1 bundles.....	41.00 to 41.50
No. 2 dealers' bundles.....	41.00 to 41.50
Bundled mach. shop turn.....	40.00 to 40.50
Galv. bundles.....	38.00 to 38.50
Mach. shop turn.....	36.00 to 36.50
Short shov. turn.....	38.00 to 38.50
Cast iron borings.....	38.00 to 39.00
Mix. borings & turn.....	36.00 to 36.50
Low phos. hvy. forge.....	49.00 to 51.00
Low phos. plates.....	47.00 to 48.00
No. 1 RR. hvy. melt.....	47.00 to 48.00
Re-rolling rails.....	60.00 to 61.00
Miscellaneous rails.....	56.00 to 57.00
Angles & splice bars.....	58.00 to 59.00
Locomotive tires, cut.....	56.00 to 57.00
Cut bolster & side frames.....	51.00 to 52.00
Standard stl. car axles.....	63.00 to 64.00
No. 3 steel wheels.....	55.00 to 56.00
Couplers & knuckles.....	55.00 to 56.00
Rails, 2 ft and under.....	59.50 to 60.00
Malleable.....	79.00 to 81.00
No. 1 mach. cast.....	71.00 to 75.00
No. 1 agricul. cast.....	66.00 to 68.00
Heavy breakable cast.....	60.00 to 64.00
RR. grate bars.....	66.00 to 68.00
Cast iron brake shoes.....	59.00 to 61.00
Cast iron carwheels.....	62.00 to 63.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$38.50 to \$39.50
No. 2 hvy. melting.....	38.50 to 39.50
No. 1 bundles.....	38.50 to 39.50
No. 2 bundles.....	38.50 to 39.50
Mach. shop turn.....	33.00 to 33.50
Shoveling turn.....	35.00 to 35.50
Cast iron borings.....	32.50 to 33.00
Mixed bor. & turn.....	32.50 to 33.00
Low phos. plate.....	46.00 to 48.00
No. 1 cupola cast.....	64.00 to 66.00
Hvy. breakable cast.....	56.00 to 58.00
Rails 18 in. & under.....	60.00 to 61.00
Rails random length.....	53.00 to 54.00
Drop broken.....	67.00 to 69.00

BOSTON

Dealers' buying prices, per gross ton, f.o.b. Boston

No. 1 heavy. melting.....	\$35.00 to \$36.00
No. 2 hvy. melting.....	33.00 to 34.00
Nos. 1 and 2 bundles.....	31.65 to 31.90
Busheling.....	31.65 to 31.90
Shoveling turn.....	28.90
Machine shop turn.....	26.90
Mixed bor. & turn.....	26.90
C'n cast chem. bor.....	36.00 to 37.00
No. 1 machinery cast.....	55.00 to 57.00
No. 2 machinery cast.....	54.00 to 55.00
Heavy breakable cast.....	53.00 to 55.00
Stove plate.....	51.50 to 52.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting.....	\$38.00 to \$38.50
No. 2 hvy. melting.....	38.00 to 38.50
No. 1 bundles.....	38.00 to 38.50
New busheling.....	38.00 to 38.50
Flashings.....	38.00 to 38.50
Mach. shop turn.....	29.50 to 31.00
Shoveling turn.....	30.50 to 32.00
Cast iron borings.....	30.50 to 32.00
Mixed bor. & turn.....	29.00 to 30.50
Low phos. plate.....	40.50 to 42.50
No. 1 cupola cast.....	52.00 to 55.00
Heavy breakable cast.....	45.00 to 50.00
Stove plate.....	48.00 to 50.00
Automotive cast.....	52.00 to 55.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$42.00 to \$43.00
No. 2 hvy. melting.....	38.50 to 39.00
No. 1 bundles.....	42.00 to 43.00
No. 2 bundles.....	38.50 to 39.00
Mach. shop turn.....	34.50 to 35.00
Shoveling turn.....	34.50 to 35.00
Mixed bor. & turn.....	34.50 to 35.00
Clean cast chemical bor.....	42.00 to 44.00
No. 1 machinery cast.....	65.00 to 66.00
No. 1 mixed yard cast.....	60.00 to 62.00
Hvy. breakable cast.....	63.00 to 64.00
Clean auto cast.....	65.00 to 66.00
Hvy. axle forge turn.....	44.00 to 45.00
Low phos. plate.....	48.00 to 49.00
Low phos. punchings.....	48.00 to 49.00
Low phos. bundles.....	46.00 to 47.00
RR. steel wheels.....	52.00 to 53.00
RR. coil springs.....	52.00 to 53.00
RR. malleable.....	75.00 to 78.00
Cast iron carwheels.....	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$42.00 to \$43.00
No. 2 hvy. melting.....	37.50 to 38.50
Bundled sheets.....	37.50 to 38.50
Mach. shop turn.....	33.00 to 33.50
Locomotive tires, uncut.....	47.00 to 48.00
Mis. std. sec. rails.....	50.00 to 51.00
Steel angle cars.....	51.00 to 52.00
Rails 3 ft and under.....	53.00 to 55.00
RR. steel springs.....	50.00 to 51.00
Steel car axles.....	56.00 to 57.00
Grate bars.....	59.00 to 60.00
Brake shoes.....	57.00 to 58.00
Malleable.....	72.00 to 73.00
Cast iron car wheels.....	61.00 to 62.00
No. 1 machinery cast.....	65.00 to 67.00
Hvy. breakable cast.....	59.00 to 60.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$37.50
No. 2 hvy. melting.....	37.50
No. 2 bundles.....	37.50
No. 1 busheling.....	37.50
Long turnings.....	\$25.00 to 26.00
Shoveling turnings.....	27.00 to 28.00
Cast iron borings.....	26.00 to 27.00
Bar crops and plate.....	42.50 to 43.50
Structural and plate.....	42.50 to 43.50
No. 1 cupola cast.....	64.00 to 67.00
Stove plate.....	63.00 to 64.00
No. 1 RR. hvy. melt.....	38.50
Steel axles.....	51.00 to 52.00
Scrap rails.....	44.00 to 45.00
Re-rolling rails.....	51.00 to 53.00
Angles & splice bars.....	51.00 to 53.00
Rails 3 ft & under.....	52.00 to 55.00
Cast iron carwheels.....	50.00 to 55.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$40.00 to \$40.50
No. 2 hvy. melting.....	40.00 to 40.50
Mach. shop turn.....	35.00 to 35.50
Short shov. turn.....	37.00 to 37.50
Cast iron borings.....	36.00 to 36.50
Low phos.....	45.00 to 45.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting.....	\$36.50 to \$37.50
No. 2 hvy. melting.....	34.50
No. 2 bundles.....	34.50
Mach. shop turn.....	29.00 to 29.50
Mixed bor. & turn.....	29.00 to 29.50
Shoveling turn.....	31.00 to 32.00
No. 1 cupola cast.....	55.50 to 56.50
Clean auto cast.....	55.50 to 56.50
Hvy. breakable cast.....	56.00 to 57.50
Charging box cast.....	56.00 to 57.50
Unstrp. motor blks.....	52.00 to 53.00
C'n cast chem. bor.....	34.50 to 35.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$39.75 to \$40.50
No. 2 hvy. melting.....	39.00
No. 1 bundles.....	39.00
No. 2 bundles.....	39.00
No. 1 busheling.....	39.00
Mach. shop turn.....	34.75 to 35.00
Shoveling turn.....	35.00 to 36.00
Cast iron borings.....	35.00
Mixed bor. & turn.....	34.00
No. 1 cupola cast.....	64.00 to 65.00
Mixed cupola cast.....	60.00 to 61.00
Charging box cast.....	56.00 to 57.00
Stove plate.....	60.00 to 61.00
Stove auto cast.....	60.00 to 61.00
RR. malleable.....	70.00 to 75.00
Small indl. malleable.....	47.00 to 49.00
Low phos. plate.....	44.75 to 46.00
Scrap rails.....	50.00 to 52.00
Rails 3 ft & under.....	57.00 to 58.00
RR. steel wheels.....	51.00 to 52.00
Cast iron carwheels.....	51.00 to 52.00
RR. coil & leaf spgs.....	51.00 to 52.00
RR. knuckles & coup.....	51.00 to 52.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$39.50 to \$40.00
No. 2 hvy. melting.....	39.50 to 40.00
No. 1 bundles.....	39.50 to 40.00
No. 1 busheling.....	39.50 to 40.00
Drop forge flashings.....	39.50 to 40.00
Mach. shop turn.....	34.50 to 35.00
Shoveling turn.....	35.50 to 36.00
Steel axle turn.....	39.50 to 40.00
Cast iron borings.....	35.50 to 36.00
Mixed bor. & turn.....	35.50 to 36.00
Low phos.....	44.50 to 45.00
No. 1 machinery cast.....	73.00 to 76.00
Malleable.....	74.00 to 76.00
RR. cast.....	78.00 to 79.00
Railroad grate bars.....	60.00 to 62.00
Stove plate.....	61.00 to 62.00
RR. hvy. melting.....	40.00 to 41.00
Rails 3 ft & under.....	60.00 to 61.00
Rails 18 in. & under.....	62.00 to 63.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting.....	\$25.00
No. 2 hvy. melting.....	25.00
No. 2 bales.....	25.00

Per gross ton delivered to consumer:

No. 3 bales.....	\$19.00
Mach. shop turn.....	16.00
Elec. furn. 1 ft under.....	\$32.00 to 34.00
No. 1 cupola cast.....	50.00 to 51.00
RR. hvy. melting.....	26.00

LOS ANGELES

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting.....	\$25.00
No. 2 hvy. melting.....	25.00
No. 1 bales.....	25.00
No. 2 bales.....	25.00
No. 3 bales.....	19.00
Mach. shop turn.....	17.00
No. 1 cupola cast.....	\$45.00 to 50.00
RR. hvy. melting.....	26.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.....	\$26.00
Elec. furn. 1 ft and under.....	30.00
No. 1 cupola cast.....	40.00
RR. hvy. melting.....	28.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point.

Heavy melting.....	\$22.00
No. 1 bundles.....	22.00
No. 2 bundles.....	21.50
Mechanical bundles.....	20.00
Mixed steel scrap.....	19.00
Mixed borings and turnings.....	17.00
Rails, remelting.....	28.00
Rails, re-rolling.....	26.00
Bushelings.....	17.00
Bushelings, new fact. prep'd.....	31.00
Bushelings, new fact. unprep'd.....	31.00
Short steel turnings.....	17.00
No. 1 cast.....	\$42.00 to 46.00
No. 2 cast.....	35.00 to 37.00

*Ceiling Price.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Nonferrous Metals Producers Give F.o.b. System Good Going Over

New York

• • • Producers of copper, zinc, lead and aluminum are avidly studying the implications to their customers and to their own commercial practices involved in any prospective change to the f.o.b. method of pricing. So far, no major producer of these metals has any intention of an early change in its method of selling because of the precedent established by steel industry action. Previous considerations which governed at the time of the decision in the cement case still hold firm, with one exception.

It is probable that the aluminum industry will be the first to take the step toward f.o.b. pricing. Producers of aluminum consider their products to be in competition with steel products in many fields, and are likely to pattern their action after that of the steel industry.

This development could occur at any time, and it is understood that other producers will permit the Aluminum Co. of America to take the lead. Both Alcoa and Reynolds have fairly widespread finishing plant locations to permit them to serve the national market without major freight costs chargeable to customers. Permanente on the West Coast is now absorbing as much as 1¢ per lb in shipments to the East. To remain competitive in eastern markets, it would be necessary for them to drop their mill prices below those of the other producers. The shortage of aluminum is so great that this may not be done for the present.

In the copper, lead and zinc markets, no producer has yet determined to take the step at an early date. The close integration of all the nonferrous metals markets is

BY JOHN ANTHONY
Nonferrous Editor

more than probable to bring about a wave of similar action by producers of all three metals once the step is initiated by any major producer.

A principal consideration in the study of the problem is the possibility of legal action by consumers to recover the cost of phantom freight involved in their purchases. Prevailing legal opinion holds that the probability of awards resulting from such actions is small. Furthermore, there is little likelihood of any consumer initiating such action in this market for fear of jeopardizing his position with suppliers.

Zinc grades, other than high grade and special high grade that are sold on a delivered basis, are sold on an East St. Louis basing point only. The New York delivered price merely represents the addition of the 63¢ per hundred lb freight cost plus 3 pct tax. Phantom freight charges are involved in a larger proportion of zinc business than in other nonferrous metals, as indicated by the following table of freight rates from producing points to New York. But freight absorption is also considerable.

East St. Louis, Ill.	63¢
Medowbrook, W. Va.	34¢
Moundsville, W. Va.	34¢
Danora, Pa.	34¢
Josephtown, Pa.	34¢
Palmerton, Pa.	27¢
Danville, Ill.	57¢
La Salle, Ill.	60¢
Ft. Smith, Ark., and Henrietta, Okla.	86¢
Amarilla, Tex., and Dumas, Tex.	98¢
Black Eagle, Mont. & Anaconda, Mont.	98.2¢

In copper, two of the major pro-

ducers are consuming all or practically all of their domestic copper production in the fabricating plants of their subsidiaries. Observers believe that there is not much probability of action being initiated by these producers. Kennecott Copper Co., producing ore at the Utah Mine and bringing it to Baltimore for refining pending the several years required for the completion of the projected Garfield, Utah refinery, is believed to be absorbing the major freight cost in the industry for open market sales.

When and if copper producers go to an f.o.b. producing point system, Midwest copper consumers will pay a greater differential based on freight cost than the present 1/8¢ addition to the Connecticut Valley price. It is estimated that the tonnage consumed in this area at present consumption levels reaches 10,000 to 20,000 tons a month. Far western consumers can expect to pay even more even if they are able to obtain their requirements from the Tacoma refinery due principally to the pressure of world requirements on the foreign copper price.

Copper producers are studying their patterns of distribution and freight absorption so as to be in a position to make a quick decision on price at producing points when and if this becomes necessary. There is no possibility of any change becoming effective before September because producers are selling August copper now. A complicating factor in the decision to be taken by producers is the effect it would have on brass and wire mill subsidiaries.

Brass mill products are highly competitive at this time. Their products are sold delivered, above a minimum order quantity, anywhere in the country. It is certain that the brass mills would be impelled to follow action initiated by metals producers which, in addition to the disparity caused by marked variations in raw materials costs, would serve to limit their sphere of market operations and add to the already high prices of their products.

Nonferrous Metals Prices

	July 14	July 15	July 16	July 17	July 19	July 20
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	17.30	17.30	17.30	17.30	17.30	17.30

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, 10,000 lb. f.o.b. shipping point, freight allowed....	16.00
Aluminum pig, f.o.b. shipping point	15.00
Antimony, American, Laredo, Tex.	35.00
Beryllium copper, 3.75-4.25% Be	
dollars per lb contained Be.....	\$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be.....	\$40.00
Cadmium, del'd	\$1.75
Cobalt, 97-99% (per lb).....	\$1.65 to \$1.72
Copper electro, Conn. Valley.....	21.50
Copper, lake, Conn. Valley.....	21.625
Gold, U. S. Treas., dollars per oz....	\$35.00
Indium, 99.8%, dollars per troy oz....	\$2.25
Iridium, dollars per troy oz....	\$100 to \$110
Lead, St. Louis	17.30
Lead, New York	17.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots.	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	\$76 to \$78
Nickel, electro, l.o.b. New York.....	36.56
Palladium, dollars per troy oz....	\$24.00
Platinum, dollars per troy oz....	\$83 to \$91
silver, New York, cents per oz....	74.625
Tin, Grade A, New York.....	\$1.03
Zinc, East St. Louis	12.00
Zinc, New York	12.65
Zirconium copper, 20 pct Zr, per lb contained Zr.	\$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

5-5-5-5 ingot	
No. 115	19.50-20.00
No. 120	19.00-19.50
No. 123	18.50-19.00
80-10-10 ingot	
No. 305	25.25
No. 315	22.25
88-10-2 ingot	
No. 210	31.00
No. 215	29.00
No. 245	23.25-23.75
Yellow ingot	
No. 405	15.25-16.00
Manganese bronze	
No. 421	19.00

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	26.00-27.00
0.60 copper, max.	26.50-27.00
Piston alloys (No. 122 type)...	23.75-24.50
No. 12 alum. (No. 2 grade)....	23.50-24.00
108 alloy	23.50-24.25
195 alloy	23.50-24.25
13 alloy	26.00-27.00
AXS-679	24.00-24.50
Steel deoxidizing aluminum, notch-bar granulated or shot	
Grade 1-95 pct.-95½ pct.....	24.50-25.50
Grade 2-92 pct-95 pct.....	24.00-25.00
Grade 3-90 pct-92 pct.....	23.00-24.00
Grade 4-85 pct-90 pct.....	22.50-23.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer.....	37%
Electrodeposited	32%
Rolled, oval, straight, delivered...	34.34
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer.....	33%
Zinc, cast, 99.99	20.50
Nickel 99 pct plus, frt. allowed	
Cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 100 oz lots per troy oz....	67½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum.....	44.00
Copper sulfate, 99.5, crystals, bbls..	12.50
Nickel salts, single or double, 425 lb bbls. frt. allowed	16.50
Nickel chloride, 300 lb bbl	23.00
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums.....	35.00
Zinc sulfate, 89 pct, granules, bbls, frt. allowed	7.90

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb., f.o.b. shipping point, freight allowed.)

Flat Sheet: 0.188 in., 2S, 3S, 25.7¢; 4S, 61S-O, 27.8¢; 52S, 29.9¢; 24S-O, 24S-OAL, 28.8¢; 75S-O, 75S-OAL, 35.3¢. 0.081 in., 2S, 3S, 26.8¢; 4S, 61S-O, 29.2¢; 52S, 31.3¢; 24S-O, 24S-OAL, 29.9¢; 75S-O, 75S-OAL, 37.0¢. 0.032 in., 2S, 3S, 28.5¢; 4S, 61S-O, 32.5¢; 52S, 35.2¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 46.6¢.	
Plate: ¼ in. and heavier; 2S, 3S, 22.8¢; 4S-F, 25.0¢; 52S, 26.1¢; 61S-O, 25.6¢; 24S-F, 24S-FAL, 26.1¢; 75S, 75S-AL, 32.9¢.	
Extruded Solid Shapes: Shape factors 1 to 4; 31¢ to 59¢; 11 to 13, 31.9¢ to 69¢; 23 to 25, 33.4¢ to 90¢; 35 to 37, 40.8¢ to \$1.25; 47 to 49, 58.7¢ to \$1.84.	
Extruded Round Rod, Square, Hex, Octagonal Bar: ¼ in. and over, 27¢ to 38¢; ½ to ¾ in., 28¢ to 40.5¢; ¾ to 1½ in., 29¢ to 43¢; 1½ to 3 in., 30¢ to 46.5¢; 3 to 5 in., 32.5¢ to 53.5¢; 5 to 6 in., 35.5¢ to 62¢.	
Rolled Rod: 1.064 to 4.5 in., 2S, 3S, 33¢ to 29.5¢; Cold-finished rod, 0.875 to 3.5 in., 2S, 3S, 35.5¢ to 31¢.	
Screw Machine Stock: Drawn, ¼ to 1½ in., 11S-T3, R317-T4, 43¢ to 34¢; cold-finished, ¾ to 1½ in., 11S-T3, 37.5¢ to 34.5¢; ¾ to 2 in., R317-T4, 33¢ to 30¢; rolled, 1½ to 3 in., 11S-T3, 34.5¢ to 31.5¢; 2½ to 3½ in., R317-T4, 29.5¢ to 28.5¢. Base 5000 lb.	
Drawn Wire: coiled, 0.051 to 0.374 in.; 2S, 35¢ to 25.5¢; 52S, 43¢ to 31¢; 56S, 45.5¢ to 37¢; 17S-T4, 49¢ to 33.5¢; 61S-T4, 43.5¢ to 33¢; 75S-T6, 75¢ to 54¢.	

Magnesium

(Cents per lb, f.o.b. mill, freight allowed. Base quantity 30,000 lb.)

Sheet and Plate: Ma. F.Sa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 60¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢ 20, 96¢-1.01; 22, \$1.22-\$1.81; 24, \$1.82-\$1.75. Specification grade higher.	
Extruded Round Rod: M, diam. in., ¼ to 0.811, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.	
Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.	
Extruded Solid Shapes, Rectangles: M, in weight per ft. for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft. per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft. per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft. per. up to 19.5 in., 44¢; 4 to 6 lb per ft. per. up to 23 in., 43¢. Other alloys higher.	
Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, ¼ to ½, \$1.14; ¾ to 1, \$1.02; 1½ to 2, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ¾ to 1, 85¢; ¾ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ¾ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.	

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets		41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	62	41
Seamless tubes	83	71
Shot and blocks		31

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	34.78		35.18
Copper, hot-rolled		31.28	
Copper, drawn		32.28	
Low brass	35.86*	32.64	32.95
Yellow brass	34.42*	31.10	31.41
Red brass	36.39*	33.17	33.48
Naval brass	31.53	30.28	36.22
Leaded brass	29.89	25.94	
Commercial bronze	37.18*	34.21	34.52
Manganese bronze	35.12	33.62	39.72
Phosphor bronze, 5 pct	55.90*	54.40	54.15
Muntz metal	31.05	29.80	34.24
Everdur, Herculooy, Olympic, etc.		38.75	39.81
Nickel silver, 10 pct		43.68	41.54
Architectural bronze	29.89		
*Seamless tubing.			

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 lb or more.)

	Heavy	Turnings
Copper	19½	18½
Yellow brass	15½	14½
Red brass	17½	16½
Commercial bronze	17½	16½
Manganese bronze	15½	14½
Leaded brass rod ends.....	15½	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper, wire.....	18.50-18.75
No. 2 copper wire.....	17.50-17.75
Light copper	16.50-16.75
Refinery brass	16.75*
*Dry copper content.	

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire.....	18.50
No. 2 copper, wire.....	17.50
Light copper	16.50
No. 1 composition.....	15.25
No. 1 comp. turnings.....	14.75
Rolled brass	11.75
Brass pipe	12.00
Radiators	12.50
Heavy yellow brass	11.00

Aluminum

Mixed old cast.....	11.50
Mixed old clips.....	11.50
Mixed turnings, dry	11.00
Pots & pans	12.00
Low copper	12.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass

No. 1 heavy copper and wire..	16½-17½
No. 2 heavy copper and wire..	15½-16½
Light copper	14½-15
Auto radiators (unsweated)...	10-10½
No. 1 composition.....	13-13½
No. 1 composition turnings.....	12½-13
Clean red car boxes.....	10-10½
Cocks and faucets	10-10½
Mixed heavy yellow brass.....	8½-9
Old rolled brass	10-10½
Brass pipe	10½-10¾
New soft brass clippings.....	12½-13
Brass rod ends	10½-10¾
No. 1 brass rod turnings.....	9¾-10¾

Aluminum

Alum. pistons and struts.....	8½-9
Aluminum crankcases.....	11-11½
2S aluminum clippings.....	12½-13
Old sheet & utensils.....	11-11½
Dry borings and turnings.....	5½-6
Misc. cast aluminum.....	11-11½
Dural clips (24S)	11-11½

Zinc

New zinc clippings.....	8½-9
Old zinc	6½-7
Zinc routings	3½-4
Old die cast scrap.....	4½-5

Nickel and Monel

Pure nickel clippings.....	17-18
Clean nickel turnings.....	13-14
Nickel anodes	17-18
Nickel rod ends	17-18
New Monel clippings.....	12-13
Clean Monel turnings.....	8-9
Old sheet Monel	10-10½
Old Monel castings.....	7½-8
Inconel clippings	9-10
Nickel silver clippings, mixed.	8-8½
Nickel silver turnings, mixed.	6½-7

Lead

Soft scrap lead.....	15½-16½
Battery plates (dry)	10½-10¾

Magnesium Alloys

Segregated solids.....	8-9
Castings	4½-5½

Miscellaneous

Block tin	81-83
No. 1 pewter	65-67
No. 1 auto babbitt	50-52
Mixed common babbitt.....	14½-14¾
Solder joints	19-19½
Siphon tops	50-52
Small foundry type	17½-18
Monotype	16½-16¾
Lino. and stereotype	15½-16
Electrotype	13½-14
New type shell cuttings.....	14½-15
Hand picked type shells.....	6½-7
Lino and stereo dross.....	8-8½
Electro dross	6-6½

NOTE

Price increases announced after press time will be shown in next issue. If they were effective on Tuesday, July 20, revisions will be made in the next issue.

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(cents per pound)	1948	1948	1948	1947
Hot-rolled sheets	2.775	2.775	2.775	2.50
Cold-rolled sheets	3.495	3.495	3.495	3.20
Galvanized sheets (10 ga.)	3.913	3.913	3.913	3.55
Hot-rolled strip	2.775	2.775	2.775	2.50
Cold-rolled strip	3.535	3.535	3.535	3.20
Plates	2.93	2.93	2.93	2.65
Plates wrought iron	7.25	7.25	7.25	5.95
Stain's c-r strip (No. 302)	30.50	30.50	30.50	30.50

Tin and Terneplate:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(dollars per base box)				
Tinplate (1.50 lb) cokes.	\$6.70	\$6.70	\$6.70	\$5.75
Tinplate, electro (0.50 lb)	5.90	5.90	5.90	5.05
Special coated mfg. ternes	5.80	5.80	5.80	4.90

Bars and Shapes:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(cents per pound)				
Merchant bars	2.875	2.875	2.875	2.60
Cold-finished bars	3.483	3.483	3.483	3.20
Alloy bars	3.213	3.213	3.213	3.05
Structural shapes	2.767	2.767	2.767	2.50
Stainless bars (No. 302)	26.00	26.00	26.00	26.00
Wrought iron bars	8.65	8.65	8.65	6.15

Wire:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(cents per pound)				
Bright wire	3.608	3.608	3.608	3.30

Rails:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(dollars per 100 lb)				
Heavy rails	\$2.725	\$2.725	\$2.725	\$2.50
Light rails	3.05	3.05	3.05	2.85

Semifinished Steel:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(dollars per gross ton)				
Rerolling billets	\$45.00†	\$45.00†	\$45.00†	\$42.00
Slabs, rerolling	45.00†	45.00†	45.00†	42.00
Forging billets	54.00†	54.00†	54.00†	50.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00

Wire Rods and Skelp:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(cents per pound)				
Wire rods	3.133	3.133	3.133	2.55
Skelp	2.888	2.888	2.888	2.35

† Net ton

Pig Iron:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(per gross ton)	1948	1948	1948	1947
No. 2, foundry, Phila.	\$44.74	\$44.74	\$44.74	\$39.22
No. 2, Valley furnace	43.50	43.50	39.50	36.50
No. 2, Southern Cinti.	48.14	45.47	45.47	38.25
No. 2, Birmingham	42.05	39.38	39.38	33.38
No. 2, foundry, Chicago†	43.00	43.00*	39.00	36.00
Basic del'd Philadelphia	44.24	44.24	44.24	39.89
Basic, Valley furnace	43.00	43.00	39.00	36.00
Malleable, Chicago†	43.50	43.50*	39.50	36.50
Malleable, Valley	43.50	43.50	39.50	36.50
Charcoal, Chicago	65.55	65.55	65.55	48.49
Ferromanganese†	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

† For carlots at seaboard.

* Revised.

Scrap:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(per gross ton)				
Heavy melt'g steel, P'gh.	40.25	\$40.25	\$40.25	\$40.25
Heavy melt'g steel, Phila.	42.50	42.50	42.50	39.50
Heavy melt'g stel, Ch'go	41.25	40.25	39.25	40.25
No. 1, hy, comp. sh't, Det.	38.25	36.25	35.50	34.00
Low phos. Young'n	45.25	45.25	45.25	43.25
No. 1, cast, Pittsburgh	63.75	63.75	63.75	39.75
No. 1, cast, Philadelphia	65.50	67.00	67.00	47.50
No. 1, cast, Chicago	73.00	70.00	69.50	47.50

Coke, Connellsville:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(per net ton at oven)				
Furnace coke, prompt	\$13.75	\$13.75	\$12.75	\$12.00
Foundry coke, prompt	16.50	16.50	16.50	13.75

Nonferrous Metals:	July 20, 1948	July 13, 1948	June 22, 1948	July 22, 1947
(cents per pound to large buyers)				
Copper, electro. Conn.	21.50	21.50	21.50	21.50
Copper, Lake Conn.	21.625	21.625	21.625	21.62
Tin, Grade A, New York	\$1.03	\$1.03	\$1.03	80.00
Zinc, East St. Louis	12.00	12.00	12.00	10.50
Lead, St. Louis	17.30	17.30	17.30	14.80
Aluminum, virgin	16.00	16.00	15.00	15.00
Nickel, electrolytic	36.56	36.56	36.56	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	35.00	35.00	35.00	33.00

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
July 20, 1948.....3.24473¢ per lb.....	...\$42.96 per gross ton....	\$41.33 per gross ton....
One week ago.....3.24473¢ per lb.....	...\$42.51* per gross ton....	\$41.00 er gross ton....
One month ago.....3.24473¢ per lb.....	...\$40.51 per gross ton....	\$40.66 per gross ton....
One year ago.....2.85664¢ per lb.....	...\$36.18 per gross ton....	\$40.00 per gross ton....

* Revised

HIGH	LOW	HIGH	LOW	HIGH	LOW
1948.... 3.27585¢ Feb. 17	3.22566¢ Jan. 1	\$42.96 July 20	\$39.58 Jan. 6	\$41.83 Jan. 29	\$39.75 Mar.
1947.... 3.19541¢ Oct. 7	2.87118¢ Jan. 7	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 2
1946.... 2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan.
1945.... 2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 2
1944.... 2.30837¢ Sept. 5	2.21189¢ Oct. 5	\$23.61	\$23.61	19.17 Jan. 11	15.76 Oct. 2
1943.... 2.29176¢	2.29176¢	23.61	23.61	\$19.17	\$19.17
1942.... 2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941.... 2.43078¢	2.43078¢	\$23.61 Mar. 20	\$23.45 Jan. 2	\$22.00 Jan. 7	\$19.17 Apr. 1
1940.... 2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr.
1939.... 2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 1
1938.... 2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June
1937.... 2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June
1936.... 2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June
1935.... 2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 2
1934.... 2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 2
1933.... 1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan.
1932.... 1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July
1931.... 1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 2
1930.... 2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec.
1929.... 2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec.

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumer at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. Delivered prices are minimum and do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Arbitrary delivered prices. (11) Hollowware enameling, gages 29 to 31 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Kaiser Co. prices (15) from 0.035 to 0.075 in. thick by ¼ to 3½ in. wide. (16) Delivered Los Angeles; add 0.55¢ per 100 lb for San Francisco. (17) Slab prices subject to negotiation in most cases. (18) 24 to 14 gage, up to 48 in.; 26 gage, up to 42 in.; 30 to 27 gage, up to 36 in.

PRODUCTS	Prices at producing points apply to the sizes and grades produced in these areas.												Detroit ¹⁰			
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio		San Francisco, Los Angeles				
INGOTS Carbon forging	\$46.00	Rerolling ingots—\$36.00 per net ton f.o.b. mill (Spot market as \$75 to \$90 per gross ton)														
Alloy	\$56.00										Canton = \$56.00					
BILLETS, BLOOMS, SLABS Carbon, rerolling ¹⁷	\$45.00	\$45.00	\$45.00	\$47.00	\$45.00	\$45.00		\$45.00								
Carbon forging billets	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00	(per net ton)									
Alloy	\$66.00	\$66.00					(Bethlehem, Massillon, Canton = \$66.00)									
PIPE SKELP	2.85 to 2.90						2.90									
WIRE RODS	2.80 to 3.55	2.80 to 3.80		2.80 to 3.05	2.85						Worcester = 3.10					
SHEETS Hot-rolled ⁶	2.75 to 2.80	2.75 to 2.80	2.75	2.80	2.75 to 2.80	2.80	2.75 to 2.80	2.80			Ashland, Ky. = 2.80					
Cold-rolled ¹	3.45 to 3.50	3.45 to 3.55	3.45	3.50		3.55	3.55	3.55 ¹⁸	3.65	3.50						
Galvanized (10 gage)	3.85	3.95	3.85 to 3.95		3.85 to 3.95		3.95	3.95	4.0	3.95	Ashland = 3.95					
Enameling (12 gage)	3.85	3.75	3.75 to 3.85	3.95			3.95		4.05	3.85						
Long ternes ² (10 gage)	4.05		4.05													
STRIP Hot-rolled ³	2.80	2.75 to 2.80	2.75	2.75 to 2.80	2.75		2.75 to 2.80									
Cold-rolled ⁴	3.50	3.55 to 3.65	3.55	3.45 to 3.50			3.55				New Haven = 3.95					
TINPLATE Cokes, 1.50 lb, ⁵ base box Electrolytic 0.25, 0.50, 0.75 lb, box	6.70	6.70	6.70		6.80			6.80	6.90	(Warren, Ohio = \$6.80)						
	Deduct \$1.00, 80¢ and 80¢ respectively from 1.50 lb coke base box price.															
TERNES, MFG., special coated FX 1	Deduct 90¢ from 1.50 lb coke base box price.															
BLACKPLATE, CANMAKING 55-70 lb, 75-95 lb, 100-128 lb	Deduct \$1.60, \$1.70 and \$1.60 respectively from 1.50 lb coke base box price.															
BLACKPLATE, h.e., 29 ga. ¹¹	4.65	4.65	4.65					4.75	4.85							
BARS Carbon Steel	2.85 to 2.90	2.85 to 2.90	2.85	2.90	2.85 to 2.90	2.90	2.85 to 2.90									
Reinforcing (billet) ⁷	2.70 to 2.80	2.70 to 2.80	2.70		2.70		2.70	2.75								
Cold-finished ¹	3.45 to 3.55	3.45 to 3.55		3.45												
Alloy, hot-rolled	3.20	3.20 to 3.30	3.20			3.30	3.20	Bethlehem, Massillon, Canton = 3.30								
Alloy, cold-drawn	4.00 to 4.10	4.00 to 4.10		4.00		4.10		Massillon, Canton = 4.10								
PLATE Carbon steel ¹²	2.90 to 2.95	2.90 to 2.95	2.90 to 2.95	2.95	2.85 to 2.90		2.90 to 2.95	Coatesville = 3.45, Claymont = 3.65 2.95 Geneva, Utah = 2.90								
Floor plates	4.05	3.95 to 4.05	3.95	4.05												
Alloy	3.70	3.70	3.70							Coatesville = 4.80						
SHAPES, Structural	2.75	2.75 to 2.80	2.75 to 2.80		2.75			Bethlehem = 2.80, Geneva, Utah = 2.75								
MANUFACTURERS' WIRE ⁸ Bright	3.45 to 3.80	3.45 to 4.05		3.45	3.45 to 3.55					Worcester = 3.75						
Spring (high carbon)	4.50	4.50		4.50						Worcester = 4.80 New Haven, Trenton = 4.80						
PILING, Steel sheet	3.30	3.30				3.30										

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. producing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge.....	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-r, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville.....	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge.....	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown.....	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg.....	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg.....	32.46	30.30	23.80	24.34	34.82	56.26
Rod, h-r, Syracuse.....	27.05	25.97	20.02	20.56	24.34	28.75
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee.....	72.09	72.09	.....	68.49	.....	.....

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	14.00¢
8 to 16	48, 60, 72	14.50¢
7	48, 60	15.75¢
6	48, 60	17.00¢
4, 5	40	17.50¢
3	40	18.50¢
2½	24, 30	19.00¢
2	24, 30	21.00¢
Carbon		
40	100, 110	6.75¢
35	65, 110	6.75¢
30	65, 84, 110	6.75¢
24	72 to 104	6.75¢
17 to 20	84, 90	6.75¢
14	60, 72	7.25¢
10, 12	60	7.50¢
8	60	7.75¢

TOOL STEEL

(F.o.b. mill)

W	Or	V	Mo	Co	Base per lb
18	4	1	—	—	82¢
18	4	1	—	5	\$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢
High-carbon-chromium*					47¢
Oil hardening manganese*					26¢
Special carbon*					24¢
Extra carbon*					20¢
Regular carbon*					17¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. mill

	Per lb
Armature	4.70¢ to 5.05¢
Electrical ...	5.20¢ to 5.45¢
Motor	5.95¢ to 6.30¢
Dynamo	6.65¢ to 7.50¢
Transformer 72	7.15¢ to 8.25¢
Transformer 65	7.85¢ to 9.20¢
Transformer 58	8.55¢ to 9.90¢
Transformer 52	9.35¢ to 9.70¢

F.o.b. Chicago and Gary: armature through motor only. F.o.b. Granite City add to lower quotation 0.55¢ for armature through and including 72, and 0.45¢ for balance.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, 100 lb and heavier, No. 1 O.H., per 100 lb.....	\$2.70 to \$2.75*
Joint bars, 100 lb.....	3.75
Light rails (from billets) per 100 lb.	3.05

* CF&I charges \$3.05.

Base per lb

Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.55¢
Tie plates, Pittsburgh, Calif.....	3.70¢
Track bolts	7.00¢
Track bolts, heat treated, to railroad	7.25¢

C-R SPRING STEEL

Base per pound f.o.b. mill

0.08 to 0.40 carbon.....	3.45¢
0.41 to 0.60 carbon.....	4.95¢
0.61 to 0.80 carbon.....	5.55¢
0.81 to 1.05 carbon.....	7.05¢
1.06 to 1.35 carbon.....	9.35¢
Worcester, add 0.20¢	

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa....	*24.00	*22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	.....
Inconel-clad		
10 pct, f.o.b. Coatesville..	30.90	.....
Monel-clad		
10 pct, f.o.b. Coatesville..	24.00	.....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh .....	.....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburgh, Calif.
Standard & coated nails*	91	112
Galvanized nails*	91	112
Woven wire fence.....	97	120
Fence posts, carloads††..	104	...
Single loop bale ties....	94	118
Galvanized barbed wire**	111	131
Twisted barbed wire..	111	...

* Also Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80-rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburgh, Calif.
Annealed fence wire†.....	\$4.10	\$5.05
Annealed, galv. fencing†.	4.55	5.50
Cut nails, carloads††.....	6.15	...

† Add 10¢ at Worcester. †† Wheeling only, Pittsburgh add 15¢ (less 20¢ to jobbers).

HIGH STRENGTH, LOW ALLOY STEELS

mill prices, cents per pound

Steel	Aidecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayaril R	Oni-cloy	Yoloy	MAX High Tensile
Producer	Repub-lic	Carnegie-Illinois, Republic	Repub-lic	Alan Wood	Inland	Bethle-hem	Jones & Laughlin	Young-town Sheet & Tube	Great Lakes Steel
Plates.....	4.55	4.45	4.55	4.55	4.45	4.55	4.45	4.55	4.55
Sheets									
Hot-rolled...	4.30	4.20	4.30	4.50	4.20	4.30	4.20	4.30	4.30
Cold-rolled...	5.30	5.20	5.30	...	5.20	5.30	5.20	5.30	5.30
Galvanized...	...	5.90	...	...	5.90	6.00	...	...	...
Strip									
Hot-rolled ..	4.30	4.20	4.30	...	4.20	4.30	4.20	4.30	4.30
Cold-rolled...	...	...	5.30	...	...	5.30	5.30	5.30	5.30†
Shapes.....	...	4.20	...	...	4.20	4.30	4.20	4.30	...
Beams.....	...	4.20	...	...	4.20	4.30	...	...	...
Bars									
Hot-rolled...	4.45	4.35	4.45	...	4.35	4.45	4.35	4.45	4.45
Bar shapes.....	...	4.35	...	...	4.35	4.45	4.35	4.45	...

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. mills, steel butt weld and seamless. Others f.o.b. Pittsburgh only. Base price, \$200.00 per net ton.

One producer allows 1 point less discount on steel butt weld.

Standard, threaded and coupled

Steel, butt weld	Black	Galv.
½-in.	48	30½
¾-in.	51	34½
1-in.	53½	37½
1¼-in.	54	38
1½-in.	54½	38½
2-in.	55	39
2½ and 3-in.	55½	39½
Wrought Iron, butt weld		
½-in.	+11	+35
¾-in.	+1½	+26
1 and 1¼-in.	4	+16½
1½-in.	9½	+13
2-in.	10	+12½
Steel, lap weld		
2-in.	44½	28
2½ and 3-in.	48½	32
3½ to 6-in.	50½	34
Steel, seamless		
2-in.	43½	27
2½ and 3-in.	46½	30
3½ to 6-in.	48½	32
Wrought Iron, lap weld		
2-in.	1½	+20
2½ to 3½-in.	4	+16
4-in.	8	+10½
4½ to 8-in.	6	+12

Extra Strong, plain ends

Steel, butt weld		
½-in.	46	30
¾-in.	50	34
1-in.	52	37
1¼-in.	52½	37½
1½-in.	53	38
2-in.	53½	38½
2½ and 3-in.	54	39
Wrought Iron, butt weld		
½-in.	+6½	+29
¾-in.	+½	+23
1 and 1¼-in.	4	+16½
2-in.	10	+12½
Steel, lap weld		
2-in.	43½	28
2½ and 3-in.	48½	32
3½ to 6-in.	50½	34
Steel, seamless		
2-in.	42½	27
2½ and 3-in.	46½	31
3½ and 6-in.	50	34½
Wrought Iron, lap weld		
2-in.	4½	+16½
2½ to 4-in.	13	+6
4½ to 6-in.	9	+10½

Basing discounts for standard pipe are for threads and couplings. For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all butt weld. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft. inclusive.

OD	Gage	Hot- Rolled	Cold- Drawn	Hot- Rolled	Cold- Drawn
2	13	\$17.84	\$20.99	\$17.30	\$20.36
2½	12	23.99	28.21	23.27	27.36
3	12	26.68	31.40	25.88	30.46
3½	11	33.35	39.26	32.35	38.08
4	10	41.40	48.70	40.16	47.24

* One company charges approx. 2 pct less.

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago.....	\$98.70
6-in. to 24-in., del'd New York.....	95.50
6-in. to 24-in., Birmingham.....	85.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	112.30
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Percent Off List
½ in. & smaller x 6 in. & shorter....	45
9/16 & ½ in. x 6 in. & shorter.....	46
¾ in. & larger x 6 in. & shorter.....	43
All diam, longer than 6 in.	41
Lag, all diam over 6 in. long.....	44
Lag, all diam x 6 in. & shorter.....	46
Plow bolts	54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	43
9/16 to 1 in. inclusive	42
1½ to 1½ in. inclusive	40
1½ in. and larger	35
On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for car-load shipments.	

Semifin. Hexagon Nuts USS SAE

7/16 in. and smaller	46
½ in. and smaller	44
¾ in. through 1 in.	44
9/16 in. through 1 in.	43
1½ in. through 1½ in.	41
1½ in. and larger	35

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate	65 and 10
In bulk	75
On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over	

Large Rivets

(½ in. and larger)

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$5.65
F.o.b. Lebanon, Pa.	5.80

Small Rivets

(7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55
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Cap and Set Screws

(In packages)

Percent Off List

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	53
¾ to 1 in. x 6 in., SAE 1035, heat treated	44
Set screws, oval points	57
Milled studs	29
Flat head cap screws, listed sizes ..	16
Fillister head cap, listed sizes	37
Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.	

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF ₂ Content:	Base price per short ton
70% or more	\$35.00
65% but less than 70%	34.00
60% but less than 65%	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer.....	\$6.60
Old range, nonbessemer.....	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDER

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags.....	7.9¢ to 9.0¢
Domestic sponge iron, 98+ % Fe	9.5¢ to 16.0¢
Electrolytic iron, annealed, 99.5+ % Fe	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ % Fe	44.0¢
Hydrogen reduced iron, minus 300 mesh, 98+ % Fe.....	63.0¢ to 80.0¢
Carbonyl iron, minus 300 mesh, 98%, 99.8+ % Fe.....	90.0¢ to \$1.75
Aluminum	23.0¢
Antimony	46.0¢
Brass	24.0¢ to 28.5¢
Copper, electrolytic	30.625¢
Copper, reduced	30.5¢
Cadmium	\$2.40
Chromium, electrolytic, 99% min.	\$3.50
Lead	24.0¢
Manganese	50.0¢
Molybdenum, 99%	\$2.65
Nickel, unannealed	51.5¢
Nickel, spherical, minus 80 mesh	53.0¢
Silicon	29.0¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	\$1.11
Tungsten, 98%, 99%.....	\$2.90

COKE

Furnace, beehive (f.o.b. oven) Net Ton	
Connellsville, Pa.	\$13.50 to \$14.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	16.00 to 17.00
Foundry, Byproduct	
Chicago, del'd	\$23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	20.50
Philadelphia, f.o.b.	19.50
Swedeland, Pa., f.o.b.	19.50
Ashland, Ohio, f.o.b.	18.25
Painesville, Ohio, f.o.b.	19.45
Erie, del'd	19.95
Cleveland, del'd	17.90
Cincinnati, del'd	18.59
St. Louis, del'd	18.03
Birmingham, del'd	16.71

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add \$5).....	\$80.00
No. 1 Ohio.....	74.00
Sec. quality, Pa., Md., Ky., Mo.....	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50).....	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.....	\$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.....	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)....	\$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	\$14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

Standard chemically bonded, Balt., Chester

Magnesite Brick	Per Net Ton
Standard, Balt., and Chester.....	\$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

Std. ½-in. grains

Domestic, f.o.b. Balt. and Chester, in bulk, fines removed.....	\$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines.....	\$30.50 to \$1.00
in sacks with fines.....	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, pet net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢.....

PRICES

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia.....	\$4.45-4.97	\$5.66-5.81	\$5.90-5.92	\$4.85-5.38	\$5.98-6.55	\$4.87	\$4.58	\$4.91	\$5.65-5.73	\$8.50-8.65	\$8.80	\$10.38	\$10.53
New York.....	4.74-4.79	5.70 ¹ -5.95 ¹	6.19	5.08-5.58	6.05-6.30	5.09-5.14	4.77-4.82	5.05-5.08	5.78	8.58-8.73	8.73-	10.23-	10.43-
Boston.....	4.88	5.74	6.28	5.64	6.90	5.23	4.94	5.09	5.96	9.05	9.20	10.51	10.66
Baltimore.....	4.27	....	5.62	4.79	....	4.72	4.69	4.84	5.66	....	....	....	....
Norfolk.....	4.90	....	....	5.30	....	5.15	5.15	5.20	6.00	....	....	....	....
Chicago.....	4.20	5.00	5.88	4.35	5.35-6.65	4.55	4.35	4.35	5.00-5.10	8.20	8.35	9.50	9.65
Milwaukee.....	4.42	5.22	5.87	5.02	5.57	4.77	4.57	4.57	5.334	8.534	8.684	9.784	9.984
Cleveland.....	4.20	5.00 ¹	5.74	4.52	5.95	4.55 [†]	4.67	4.35	5.00-5.10	8.20	8.35	9.50	9.65
Buffalo.....	4.25	5.15	6.06	5.26	5.72	4.96	4.40 [†]	4.40 [†]	5.10	8.64	8.72-	9.84-	10.14-
Detroit.....	4.60	5.45	6.07	4.80	5.70	4.90 [†]	4.80	4.50	5.16	8.87	9.02	10.17	10.32
Cincinnati.....	4.59	5.22	5.57	4.80	....	4.96	4.80	4.76	5.59	8.85	9.00	10.16	10.31
St. Louis.....	4.59	5.39	6.17-6.27	4.69-5.24	5.97	4.89-4.94	4.74	4.74	5.62	8.82	8.97	10.07	10.42
Pittsburgh.....	4.20-4.25	5.10 ¹	5.65	4.30-4.35	....	4.55	4.35	4.35	5.00	8.20	8.35	9.50	9.65
St. Paul.....	4.65	5.46	6.01	4.76	....	5.01	4.81	4.81	5.94	....	....	....	....
Omaha.....	5.31	....	6.76	5.41	....	5.68	5.41	5.46	6.06	....	....	....	....
Indianapolis.....	4.52	5.31	5.96	4.62	5.72-5.87	4.87	4.67	4.67	5.52	....	....	9.97	10.17
Birmingham.....	4.45 ¹¹	....	5.80	4.45 ¹¹	....	4.65 ¹¹	4.40 ¹¹	4.40 ¹¹	5.96	....	....	....	....
Memphis.....	4.91 ¹¹	5.98 ¹	5.08 ¹¹	5.11 ¹¹	5.23 ¹¹	5.21 ¹¹	5.01 ¹¹	5.01 ¹¹	5.50	....	....	....	....
New Orleans.....	*5.08 ¹¹	6.44 ¹	....	5.28 ¹¹	....	5.38 ¹¹	*5.10 ¹¹	*5.18 ¹¹	6.34 ⁸	....	....	....	....
Houston.....	5.55	....	7.21	5.65	....	5.90	5.70	5.70	7.00	9.40	9.25	10.40	10.55
Los Angeles.....	5.70	7.25 ¹	7.30	6.00	8.60 ⁶	5.35	5.15 ^{**}	5.45	7.25 ¹⁴ -7.35 ¹⁴	9.55 ¹⁵	9.40 ¹⁵	10.95 ¹⁵	11.15 ¹⁵
San Francisco.....	5.35 ⁸	6.55-7.25	7.05-7.45	5.70 ⁸	8.60	5.30	5.10 ^{**}	5.00	7.40	9.55 ¹⁵	9.40 ¹⁵	10.95 ¹⁵	11.15 ¹⁵
Seattle.....	5.45 ⁴	7.25 ³	7.10 ³	8.15 ⁴	....	5.60 ⁴	5.30 ⁴	5.65 ⁴	7.35 ¹⁴ -7.45 ¹⁴	8.70 ¹⁵	9.70 ¹⁵	....	11.30 ¹⁵
Portland.....	7.70 ⁴	7.25 ³	7.10	5.95 ⁴	....	5.70 ⁴	5.40 ⁴	5.65 ⁴	7.45 ¹⁴	....	8.95 ⁶	....	11.30 ¹⁵
Salt Lake City.....	6.40	....	7.85	6.70	....	6.00	6.25	6.56	7.55	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.
HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.
COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.
GALVANIZED SHEETS: 450 to 1499 lb.
EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 800 to 4999 lb; (4) 800 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 999 lb; (10) 500 to 999 lb; (11) 400 to 9999 lb; (12) 450 to 3749 lb; (13)

400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.
 * Add 46¢ for sizes not rolled in Birmingham.
 † Up to ¾ in. thick and 90 in. wide.
 ‡ Add 41¢ for sizes not rolled at Buffalo.
 ** Add 15¢ for sizes not rolled at Geneva.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES						DELIVERED PRICES† (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem.....	40.00	40.50	41.00	41.50	....	Boston.....	Everett.....	\$0.50 Arb.	46.27	48.75	49.25	....	52.27
Birmingham.....	38.88-42.88	39.38-43.38	....	....	....	Boston.....	Steelton.....	6.27	46.27	48.75	49.25	....	52.27
Buffalo.....	40.00-42.38*	40.00-42.88*	40.50*-43.38	....	....	Brooklyn.....	Bethlehem.....	3.90	43.90	44.40	44.90	45.40	....
Chicago.....	42.50	43.00	43.50-	44.00	....	Cincinnati.....	Birmingham.....	6.09	44.97-48.97	45.47-49.47	....	....	....
Cleveland.....	38.50-39.75*	39.00-402.5*	39.50*-40.75	....	....	Jersey City.....	Bethlehem.....	2.39	42.39	42.89	43.39	43.89	....
Duluth.....	43.00	43.50	44.00	44.00	....	Los Angeles.....	Provo.....	6.93	45.93-	44.43	....	....	....
Erie.....	42.50	43.00	43.50	44.00	....	Mansfield.....	Cleveland-Toledo.....	3.03	41.53	42.03-	42.53	....	....
Everett.....	45.25	45.75	46.25	....	....	Philadelphia.....	Bethlehem.....	2.17	42.17	42.67	43.17	43.67	....
Granite City.....	42.00	42.50	42.50	43.00	....	Philadelphia.....	Swedeland.....	1.31	46.31	46.81	47.31	47.61	....
Neville Island.....	39.00	39.50	....	....	....	Steelton.....	Steelton.....	2.81	42.81	....	....	....	48.81
Provo.....	43.00	43.50	43.50	44.00	....	San Francisco.....	Provo.....	6.93	45.93	46.43	....	....	....
Sharpsville.....	40.00	....	....	....	46.00	Seattle.....	Provo.....	6.93	45.93	46.43	....	....	....
Struthers, Ohio.....	42.50	....	....	....	....	St. Louis.....	Granite City.....	0.75 Arb.	46.00	46.50	47.00	....	....
Swedeland.....	45.00	45.50	46.00	46.50	....	....	....	....	....	....	....	....	....
Toledo.....	42.50	43.00	43.50	44.00	....	....	....	....	....	....	....	....	....
Troy, N. Y.....	....	....	....	....	....	....	....	....	....	....	....	....	....
Youngstown.....	43.00	....	43.50	44.00	....	....	....	....	....	....	....	....	....

* Republic Steel Corp. price. Basis: pig iron at Cleveland and Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Cleveland and Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00

pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—\$53.50; f.o.b. Buffalo—\$54.75. Add \$1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$58.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, \$65.55. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Phila., New York, Birmingham. Carload lots (bulk)\$145 F.o.b. Rockwood, Tenn.\$150 Less ton lots (packed) 189.00 Delivered Pittsburgh 151.00 \$1.80 for each 1% above 82% Mn; penalty, \$1.80 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk ...	8.70	8.95	9.50
Ton lots	10.30	10.90	12.80
Less ton lots	11.20	11.80	13.70

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	\$51.00	\$52.00
F.o.b. Pittsburgh. 50.00		51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

.96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
Carload, bulk 32
L.c.l. lots 34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn.	23.00	24.85	26.05
0.10% max. C.	22.50	24.35	25.55
0.15% max. C.	22.00	23.85	25.05
0.30% max. C.	21.50	23.35	24.55
0.50% max. C.	21.00	22.85	24.05
0.75% max. C., 7.00% max. Si.	18.00	19.85	21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload bulk	7.80
Ton lots	9.45
Briquet, contract, basis, carlots, bulk freight allowed, per lb of briquet	8.75
Ton lots	10.35
Less ton lots	11.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth \$78.00, foundry, \$79.00; \$78.75 f.o.b. Niagara Falls; \$77.50 f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe.	16.90	17.50	18.10
97% Si, 1% Fe.	17.30	17.90	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk ...	5.25	5.50	5.70
Ton lots	6.85	7.45	7.75
Less ton lots ...	7.75	8.35	8.65

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	16.50		
50% Si	9.30	9.80	10.00
75% Si	11.80	12.10	12.85
85% Si	13.30	13.60	14.35
90% Si	15.00	15.30	16.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings Distilled
Ton lots	\$1.85 \$2.70 \$3.40
Less ton lots	2.20 3.05 4.20

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	26.50	26.90	27.00
0.10% C	26.00	26.40	26.50
0.15% C	25.50	25.90	26.00
0.20% C	25.25	25.65	25.75
0.50% C	25.00	25.40	25.50
1.00% C	24.50	24.90	24.75
2.00% C	24.25	24.65	24.75

65-69% Cr, 4-9% C 18.60 19.00 19.15
62-66% Cr, 4-6% C. 19.45 19.85 20.00

Briquets—Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk ...	12.50	12.75	12.85
Ton lots	14.00	14.90	15.50
Less ton lots ...	14.90	15.80	16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	19.70	20.10	20.25
Ton lots	21.85	23.15	23.95
Less ton lots	23.35	24.65	25.45

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	25.00	25.40	25.50
Ton lots	27.30	27.95	29.15
Less ton lots	29.10	29.75	30.95

Chromium Metal

Contract prices, cents per lb, chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr. 1% max. Fe.

	Eastern	Central	Western
0.20% max. C.	97.00	98.50	99.75
0.50% max. C.	93.00	94.50	95.75
9.00% min. C.	91.50	93.00	94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
30-35% Ca, 60-65% Si, 3.00% max. Fe			
Cr 28-32% Ca, 60-65% Si, 6.00% max. Fe.			
Carloads	16.25	16.75	18.80
Ton lots	19.35	20.10	22.25
Less ton lots	20.85	21.60	23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
16-20% Ca, 14-18% Mn, 53-59% Si.			
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots	20.80	21.65	23.40

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.			
Alloy 5: 60-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.			
Ton lots	18.00	19.10	21.05
Less ton lots	19.25	20.35	22.30

V Foundry Alloys

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn. V-7: 28-32% Cr, 15-21% Si, 14-16% Mn.

Ton lots	14.60¢
Less ton lots	15.85¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed. Si 56%, Ti 9%, Ca 5%.

Ton lots	17.90¢
Less ton lots	19.40¢

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
00-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.			
Ton lots	15.75	16.85	18.80
Less ton lots	17.00	18.10	20.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed... \$2.25

Ferrovandium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V. Openhearth \$2.90
Crucible 3.00
High speed steel (Primos).... 3.10

Vanadium pentoxide, 88-92% V₂O₅ contract basis, per pound Contained V₂O₅ \$1.20

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb. Ton lots \$2.50
Less ton lots \$2.55

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. 95¢

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo. 80¢

Molybdenum oxide in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo. 80¢

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti \$1.23

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti \$1.85
Less ton lots \$1.40

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton...\$152.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton \$65.00
10 tons to less carload..... \$75.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots 13.40¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy.

Carload, bulk 6.00¢

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carload 7.20¢

Ton lots 7.70¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Car lots 10.50

Ton lots 11.25

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
	\$1.20	\$1.23	\$1.21

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots \$1.89 \$1.903 \$1.935

Less ton lots. 2.01 2.023 2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots...\$1.80 \$1.8125 \$1.8445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots 39.00¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1 93¢

No. 6 63¢

No. 79 45¢

Bortam, f.o.b. Niagara Falls

Ton lots, per pound..... 45¢

Less ton lots, per pound..... 50¢

Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.

Ton lots, per pound..... 8.625¢

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3%-4%, Si 40%-45%, per lb contained B..... \$6.25

Wage Raise

(CONTINUED FROM PAGE 121)

of U. S. Steel will soon announce increases in their prices for various steel products at their mills or shipping points, following the completion of the cost study now being made.

"These forthcoming price increases are not occasioned to the slightest extent by the recent abandonment of these subsidiaries of the basing point method of selling steel in order to comply with the law of the land, as determined by the U. S. Supreme Court. That is an entirely separate matter. This recent change in our subsidiaries' selling methods does not by itself increase the cost of producing steel. These forthcoming price increases are solely due to the fact

that steel prices have not kept pace with rising costs. We are obliged to give due heed to these unwelcome financial facts, if U. S. Steel is to remain in a healthy condition.

"Steel will continue after these price increases to be the lowest priced basic commodity. In May, 1948, the average price per ton received by the steel-producing subsidiaries of U. S. Steel was 42 pct greater than the corresponding price for the same products in 1940. According to the U. S. Bureau of Labor Statistics, the average wholesale price index of all commodities advanced 108.4% between 1940 and May, 1948. Food products alone advanced 148.8% during this period, and farm products advanced 179.3%. It is most evident that steel prices lag far behind in the price procession."

50 YEARS AGO

THE IRON AGE, July 21, 1898

• "A good deal of publicity has been given to tables showing the productive capacity of our iron and steel works. However, the important factor in connection with the availability of capacity for actual production is the price. The true problem for solution is how much capacity can be brought into activity at a given market price."

• "Now that the annexation of Hawaii is an accomplished fact, we may, without touching upon its political aspects, give some attention to the existing commercial conditions there as well as future possibilities. It is no longer a question of whether it was wise to acquire these islands in the Pacific, but what advantage can be gained from our new possession."

• "The Spanish War and more favorable conditions in Europe, together with increased restrictions placed on immigrants, have conspired to limit the flow

of immigration into this country.

• "The current scarcity of rubber has given additional interest to the development of a new substitute called oxylene which is obtained by the oxidization of linseed oil with which has been mixed, as an agglutinating substance, pounded jute waste."

• "Those wide awake persons, the advertisement writers, have naturally seized upon the incidents of the present war and turned them to account in many ingenious ways. One of the most striking of recent eye-catchers is the ad of a Cincinnati firm, which reads thus: 'I Want to C-U-B-A Customer of Mine'."

• "The oldest steam engine in existence which is owned by Birmingham Canal Navigators in England, was constructed by Bolton & Watt in 1777. This 120-year old engine has been regularly at work from the time of its erection to the present year."

Joins The Iron Age Staff

New York

• • • James M. Spackman has joined the staff of THE IRON AGE as Pittsburgh Regional Business Manager.



James M. Spackman

He replaced John M. Huggett, who has resigned to become executive vice-president and a member of the firm of Bond & Starr Pittsburgh advertising agency.

Mr. Spackman has been New York district manager of Engineering News Record and Construction Methods for the past 9 years.

Before joining the McGraw-Hill organization he was advertising manager of the National Steel Fabric Company division of Pittsburgh Steel Corp., Pittsburgh, Pa.

New Laboratory To Be Built

New York

• • • Cornerstone for the first of a new group of modern research laboratories for Sylvania Center was laid here recently by Walter E. Poor, chairman of the board of Sylvania Electric Products, Inc. This new campus type of research laboratory is the first of its kind to be built in New York City.

The initial building, which, with its equipment, will cost about \$1 million, will be dedicated this fall. It will be one of the group of laboratories that comprise the 28½-acre Sylvania Research Center.

Names Board Director

Washington

• • • Chairman Arthur M. Hill has named George E. Felton, Boston, as Director of Production, a key position of the National Security Resources Board.

The new production chief is a well known New England industrialist, having major interests in a number of manufacturing firms including the Norfolk Paint & Varnish Co., and the Burche Silver Corp.

Cuts Beam Cost \$2.57 to 71 cents with Arc Welding

By G. C. Weiland

The Schaffer Poidometer Company
Pittsburgh, Pa.

SUBSTANTIAL savings in manufacturing costs are readily possible through a careful design study of component parts for arc welded construction. This fact is well supported by our recent experience with a scale beam originally costing us \$2.57 to produce. Redesign for arc welded assembly has cut the cost to 71 cents, and the weight 25%. In addition, the performance of our product has been improved and the appearance greatly enhanced for better sales appeal.

Our product, the Poidometer (Fig. 1), is a continuous weighing machine. It incorporates a moving belt carrying the material to be weighed. A roll directly below the conveyor belt

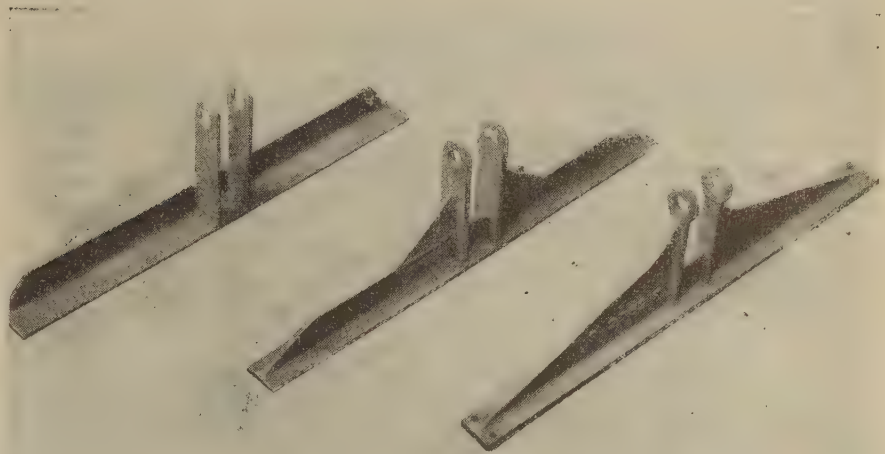


Fig. 2. Progressive redesign of scale beam to welded construction. Right: Original beam . . . Cost \$2.57. Center: First design change . . . Cost \$1.63. Left: Present design . . . Cost 71 cents.

takes the direct load of the material, transmitting the load force to a balance scale through a beam member (Fig. 2) acting as a fulcrum.

Pressed with a demand urgency for our weighing machines during

the recent years plus a supply problem of securing parts for our original construction, led us to redesign the scale beam member. The first redesign followed the pattern of the original casting shape and cut the manufacturing cost of this scale beam from \$2.57 to \$1.63.

Further study of this component part along with the suggestions of a Lincoln design engineer, prompted a second change. This change greatly simplified our design by incorporating two formed steel straps arc welded to an angle piece as shown in Fig. 2. With this latter design, our production cost is cut to 71 cents and a weight reduction is made from an original 10 pounds to 7 pounds.

In addition to the above savings, the change to welded construction eliminates 0.28 man-hours per beam for several machining operations that are now cut out entirely.

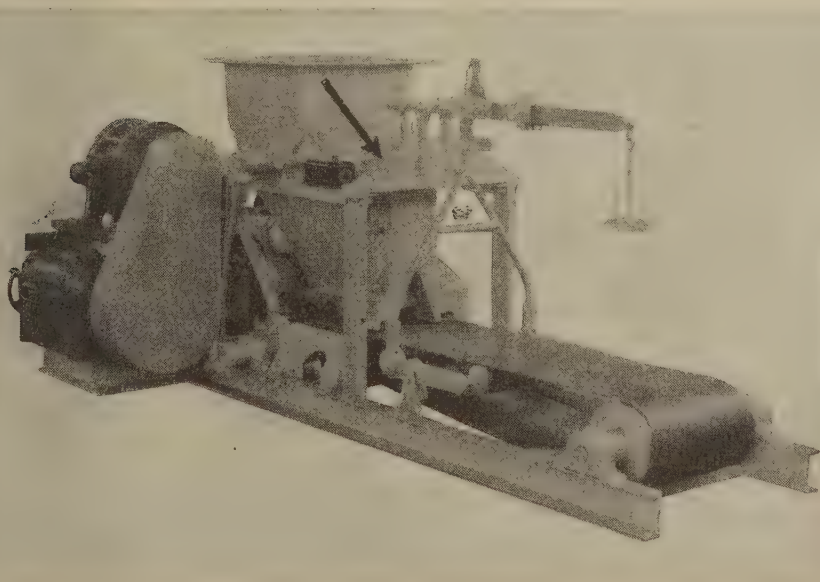


Fig. 1. The Schaffer Poidometer continuous weighing machine. Arrow shows scale beam of former construction.

The above is published by LINCOLN ELECTRIC in the interests of progress. Machine Design Studies are available to engineers and designers. Write The Lincoln Electric Company, Dept. 67, Cleveland 1, Ohio.

Advertisement

Is Your Plant as Modern as Your Product?

Step Up Productive Output **MH*** with **TOWMOTOR**

Overcome the handicap of obsolete handling methods—let Towmotor Mass Handling help you increase productive output in your plant. Versatile, gasoline-powered Towmotor Fork Lift Trucks and Towmotor Accessories provide all the benefits of modern handling techniques for every plant, large or small . . . handling raw materials and finished products of every size, shape and type . . . 24 hours a day. Turn to

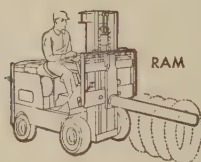
Towmotor for the solution to your handling problem. Follow the lead of the men who have to make handling pay a profit. More professional handlers use Towmotor than any other fork lift truck.

If your handling problems cannot be solved with a standard Towmotor unit, our engineers will analyze your procedures, design special equipment necessary to meet your specific needs. Details available without obligation.

* M H is Mass Handling, the systematic movement of the most units, in the shortest time, at the lowest cost.

Towmotor Fork Lift Truck, Model LT-50, equipped with Towmotor Revolving Carriage Accessory for transfer movement of bulk materials.

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YOUR PRODUCT HERE



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Towmotor Fork Lift Truck and Tractor Guide—informative, helpful information about the complete line of Towmotor materials handling equipment. Send for a free copy.

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REPRESENTATIVES IN ALL PRINCIPAL CITIES IN U. S. AND CANADA



TOWMOTOR
THE ONE-MAN-GANG

**FORK LIFT TRUCKS
and TRACTORS**

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

PERSONALS

(Continued from page 112)

• **Joseph L. Herman** who has been with Keystone Steel & Wire Co., Peoria, Ill., for 49 years, has retired. Mr. Herman joined the company as a spooler boy. He was successively fence machine operator, foreman of the wire drawing department and wire mill superintendent.

• **Dilts S. McHugh** has been appointed representative in the state of Kansas for Hauser Machine Tool Corp., Manhasset, N.Y.

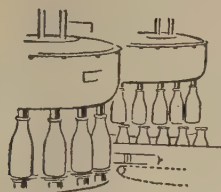
• **Wilson A. Jones** has been appointed director of engineering in industrial relations, Ford Motor Co., Dearborn, Mich. Mr. Jones formerly served as personnel representative for the engineering division.

• **Arthur W. Crossley** has been elected treasurer, Diamond Alkali Co., Pittsburgh, succeeding **William H. Evans**, who, in addition to his duties as general manager of the company's silicate-producing plants, has been acting treasurer. Mr. Crossley was formerly associated with Potomac Electric Power Co.

• **Dell W. Savage** has been named eastern sales manager, Thew Shovel Co., Cleveland, with his headquarters in New York. **Robert T. Maynard** has been appointed to succeed Mr. Savage as Mid-Atlantic sales manager, with his headquarters in Washington, D. C. Mr. Maynard will also assist in directing the company's export contacts in the east. He was formerly associated with the Osgood Co. **Joseph I. Beles** has been appointed district sales manager of the North Midwest territory, with headquarters in Milwaukee. Mr. Beles, formerly associated with R. G. LeTourneau Inc. will supervise all Thew-Lorain interests in the territory.

• **John S. Conant** has been appointed general purchasing agent of Willys-Overland Motors, Toledo, succeeding **George Edellstein**, who has resigned. Mr. Conant was formerly associated with Technical Managers Inc. and the American Steel & Wire Co. **Marden R. Bishop** has been appointed assistant director of public relations for Willys-Overland. He has been a staff member of the public relations department since 1945 when he joined the company as editor of the employee and sales publications. **Cec**

Stop Corrosion ... Use Globe Stainless Steel Tubes



When corrosion is found in tubing or metal parts formed from tubing, Globe Steel Tubes Co. can help you solve that problem. Not by suggesting just any stainless steel tubing . . . but by recommending the correct analysis and metallurgical prop-

erties of the Globe Stainless Steel Tubing to best meet your specific operating conditions.

Globe Steel Tubes Co. can do this because they study the problem in cooperation with your engineers in your plant and in Globe's completely equipped, metallurgical, physical and chemical laboratories. Result: You get recommendations for the specific analysis and metallurgical properties of stainless steel tubing in the size and finish you

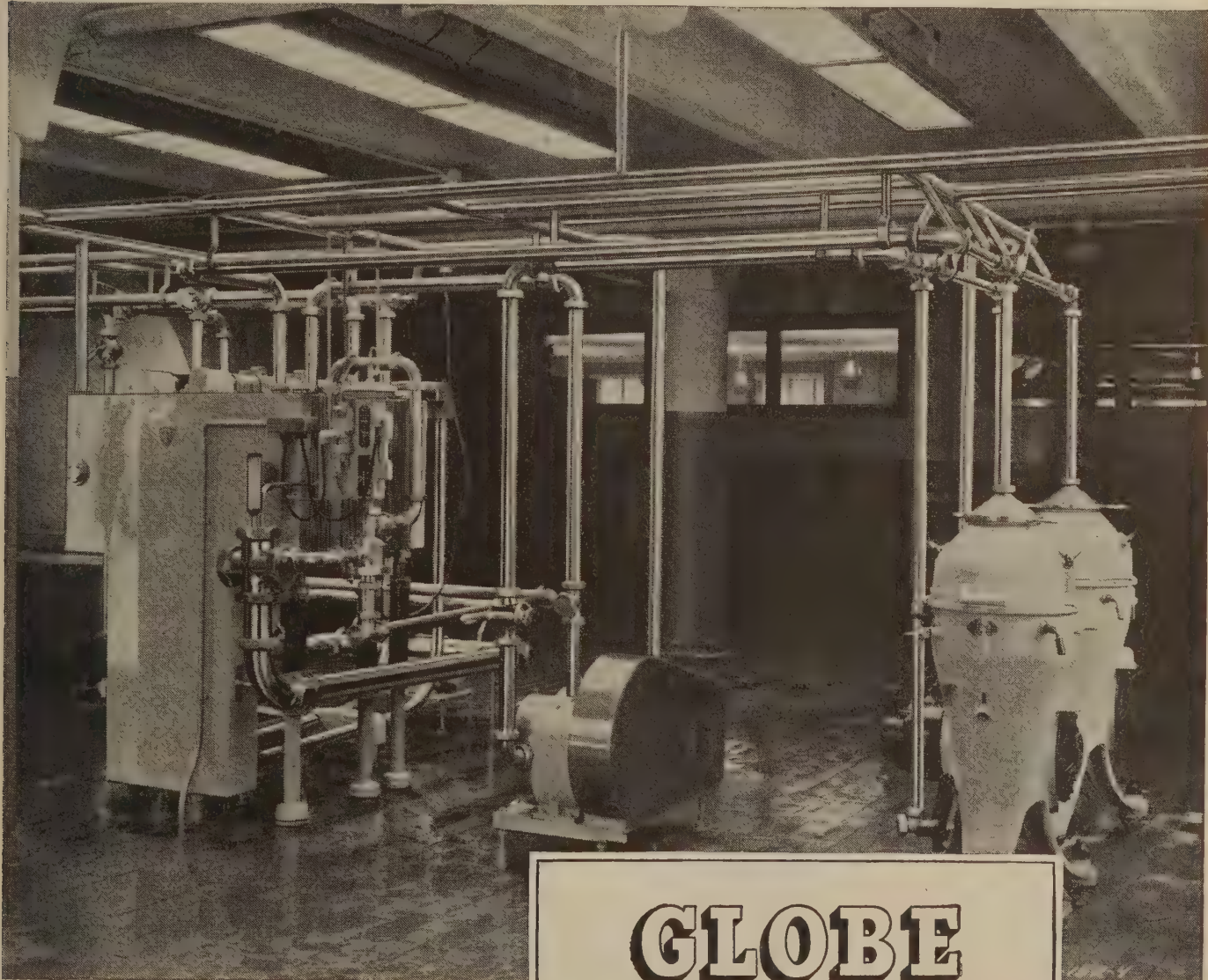
need to do your job best at maximum economy.

Globe Steel Tubes Co. has been rendering this service to industry for 40 years. Many of your problems involving tube failure, metallic contamination, corrosion, scaling and sanitation are an old story to Globe. Chances are, the answer to your problem is immediately available for the asking.

Let Globe Steel Tubes Co. assist you in surveying your tubing needs and problems, and you are assured of an outstandingly dependable source for steel tubing of all kinds: Stainless, Mechanical, Alloy Steel and Pressure . . . in a wide range of sizes and types to meet your requirements . . . plus the engineering and research facilities to solve your tubing problems.

GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin

Photo courtesy Creamery Package Mfg. Co.



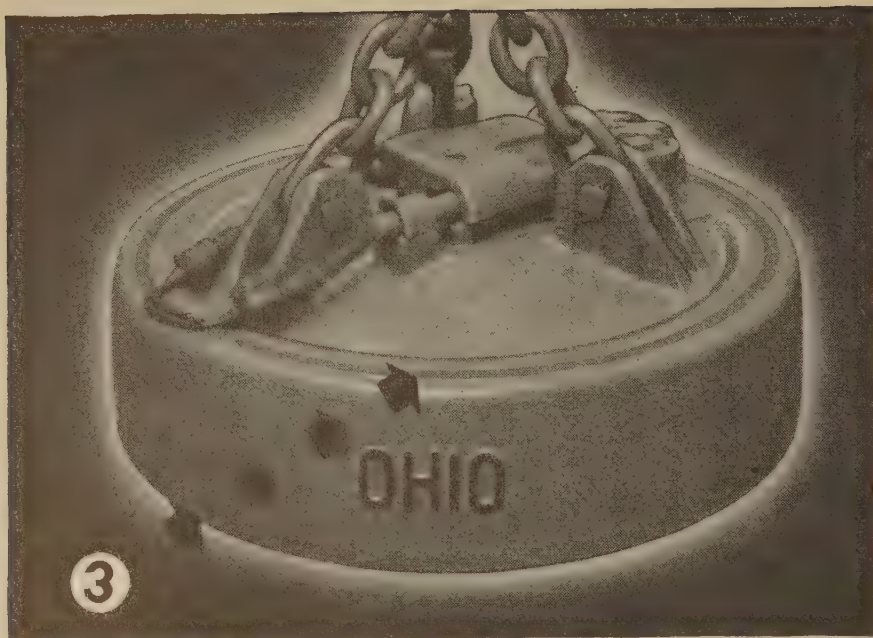
Free valuable technical data in Globe Steel Tubes Co.'s new "Bursting Pressure Bulletin No. 112A".



GLOBE

Stainless
STEEL TUBES





Only new **PROTECTO-WELD** design gives you all three magnet features

Investment in a welded lifting magnet, to be sound, ought to satisfy three vital requirements. They apply equally to all types of operation, whether steel mill, scrap yard, railroad or fabricating plant.

Is the magnet rugged enough for the roughest jobs? Ohio Protecto-Weld Magnets withstand hard knocks day in and out for years. Heavy-duty outer ring and top plate are welded together **ON TOP OF THE MAGNET**. Frequent blows against magnet side cannot crack or damage welded area. Magnet remains hermetically sealed against moisture indefinitely!

Does the magnet lift efficiently over extended periods of operation? Ohio Protecto-Weld Magnets use heavier-duty copper coils with non-cracking asphaltum insulation. They operate cooler, lift more uniformly for longer periods of operation.

Can the magnet be serviced, if necessary, quickly and economically? Since the weld on Ohio Protecto-Weld Magnets is **ON TOP**, it retains its shape, is never dented in. Thus, the weld can be turned down for disassembly without cutting away outer ring. Repairs are effected quickly, economically, without replacing outer pole.

Only Ohio Protecto-Weld Magnets give you *all three big advantages*. Sizes include 39, 55 and 65 inches diameter; 4, 6 or 8-coil construction. Write today for details to Ohio—*leader in magnetic materials handling*.



*also a leading name in
the small motor field*

THE OHIO ELECTRIC MFG. CO.

5908 Maurice Ave.

• Cleveland 4, Ohio

PERSONALS

L. Johnson has been appointed director of manufacturing facilities and methods. Mr. Johnson joined the company in 1940 and last year was named assistant works engineer. **Richard M. Hanselman** has been promoted to works engineer and **W. C. Giessler** has been named acting assistant works engineer.

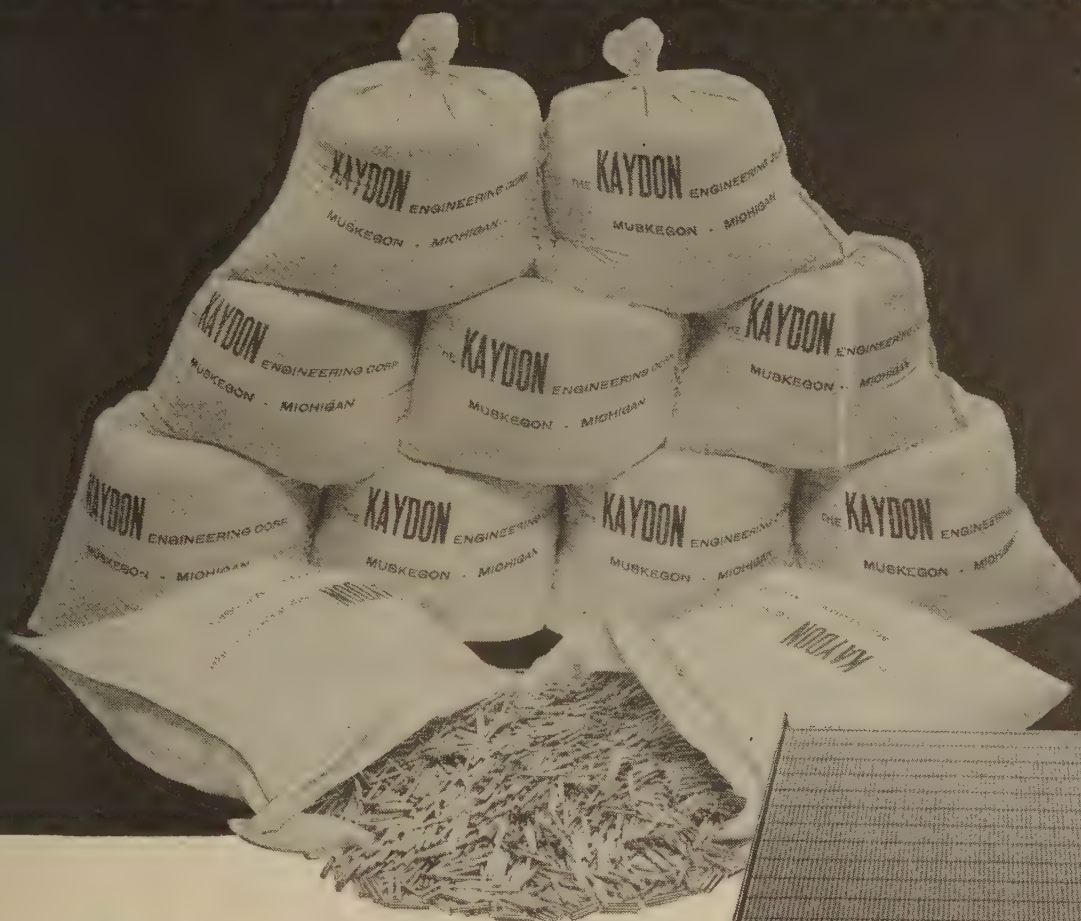
• **R. I. Parker** has been elected a commercial vice-president of the General Electric Co., in Chicago, succeeding **W. O. Batchelder**, who has retired. **T. B. Ellis** has been appointed to succeed Mr. Parker as central district manager of the Apparatus Dept., with headquarters in Chicago. Mr. Ellis was formerly district manager of the Industrial Div. Mr. Batchelder joined G.E. in 1905 and has served as a commercial vice-president since 1934. **George P. Lehmann**, formerly manager of the Plastics Div., Pittsfield, Mass., has been appointed to the personal staff of Dr. Zay Jeffries, vice-president of the company. **Robert L. Gibson**, formerly manager of the Chemical Dept.'s Personnel Div. and the Advertising and Sales Promotion Div., has been appointed to succeed Mr. Lehmann. **Raymond G. Schieleas** has been named buyer for the company's Resin & Insulation Materials Div. Previous to his new appointment, Mr. Schieleas was a buyer in the Purchasing Dept. of the general office of the company.

• **E. J. LeViseur** has been appointed superintendent of Maintenance and **J. M. Morris** has been named general maintenance engineer, Pittsburgh Works, Jones & Laughlin Steel Corp.

• **William A. Browne** has been appointed merchandising supervisor, Radio Div., Sylvania Electric Products Inc., Emporium, Pa. Mr. Browne was formerly connected with the Electronics Div. in Boston as engineering buyer for radar development, service station manager and customer service supervisor.

• **George B. Koch** has been named advertising and sales promotion manager for B. F. Goodrich Chemical Co., Cleveland, Ohio. **John F. Moriarty**, who formerly directed advertising production, has been named to succeed Mr. Koch, handling publicity. **John F. Amos**, who has been in the company's techni-

FOR ALL MACHINERY MANUFACTURERS



Millions of KAYDON *precision needle rollers

*Tolerance on diameter .0002". On the Inspection Board shown above are KAYDON Needle Rollers .1250" diameter.

The success of KAYDON Precision NEEDLE ROLLERS in automobile and truck transmissions, universal joints, clutches, steering gears and other products, has led to their use in practically all types of machinery.

Since these needle rollers may be used between hardened shafts and hardened bores of housings or gears, they eliminate the need for bearing races. Thus they provide the most compact high-capacity anti-friction bearing possible, requiring little or no more space than so-called plain or "solid" bearings.

Millions of these precision needle rollers are being made in standard sizes, $\frac{1}{16}$ " to $\frac{5}{16}$ " diameters (tolerance .0002" on diameter), flat or rounded ends. Other sizes are being added as "standard" when quantities warrant.

By using standard sizes that are now in big volume production, you get the benefit of low cost for highest performance-proved quality in small or large quantities . . . but regardless of whether your machine design permits use of standard sizes or demands special needle rollers, contact KAYDON.

Be sure to state sizes and quantities when you send your inquiries.

Capacity also available now for all types and sizes of KAYDON Standard or Special Bearings. It pays to "contact KAYDON of Muskegon."

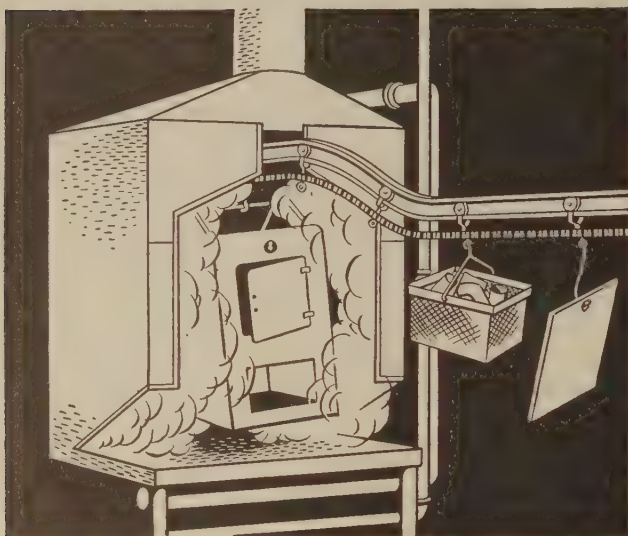
KAYDON Types of Standard or Special Bearings:

Spherical Roller • Taper Roller • Ball Radial
Ball Thrust • Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

All types of Ball and Roller Bearings 4" bore to 120" outside diameter

PARTS CLEAN SOLUTION CLEAR



THANKS TO WYANDOTTE MK-50 SOLVENT DETERGENT

WYANDOTTE MK-50 is without an equal as an emulsion cleaner. It may be used with or without alkalis in pressure-type metal parts washing machines—also as an additive to drawing, cutting, grinding and slushing oils and compounds to facilitate their removal after metal processing.

As a solvent detergent, MK-50 is used primarily in spray-type washing machines for cleaning parts between machining operations and prior to inspection, painting, etc.

It rinses quickly and thoroughly and leaves no harmful salts on the metal surface. It is a neutral product and *does* leave a very light film on the metal which serves as a temporary rust in-

hibitor. This film helps bond any paint, enamel or lacquer finish.

MK-50 helps keep the washing solution clear, too. In the metal parts washing machine, it will throw out the absorbed oils and grease, so that they may be held on the surface of the sump or overflow section of the washer. This leaves the main body of the solution relatively clear.

Your Wyandotte Representative will be glad to tell you more about Wyandotte MK-50 and other Wyandotte Metal Cleaners. He's only a telephone call away.



WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN • SERVICE REPRESENTATIVES IN 88 CITIES

cal service laboratory, will do technical writing. These new appointments are the result of the resignation of **H. W. Brinkerhoff**, former advertising manager, and **J. L. Whiteman**, former sales promotion manager, who have resigned from the company.

• **John C. Hines** has been appointed sales manager of AC Spark Plug Co., Flint, Mich. He joined the company in 1915. **James F. Kingsley** has been named to succeed Mr. Hines as regional manager for AC in Philadelphia. Mr. Kingsley has been prominently connected with the AC sales department since 1924.

• **Jack Suttie** has been appointed special grinding wheel representative for the Middle West and South West for U. S. Rubber Co., Chicago. Mr. Suttie became associated with the company in 1941.

• **Dr. Karl Cohen** has been named director of atomic activities for the H. K. Ferguson Co., Cleveland. Dr. Cohen was formerly associated with Standard Oil Development Co. as specialist on industrial applications of atomic energy.

• **E. L. Behrends**, formerly vice-president of George B. Limbert Co., has joined the general sales department of Taylor Forge & Pipe Works, Inc., Chicago. Mr. Behrends was previously manager of the Western Supply Div., of the Lummus Co., operating the former Limbert facilities.

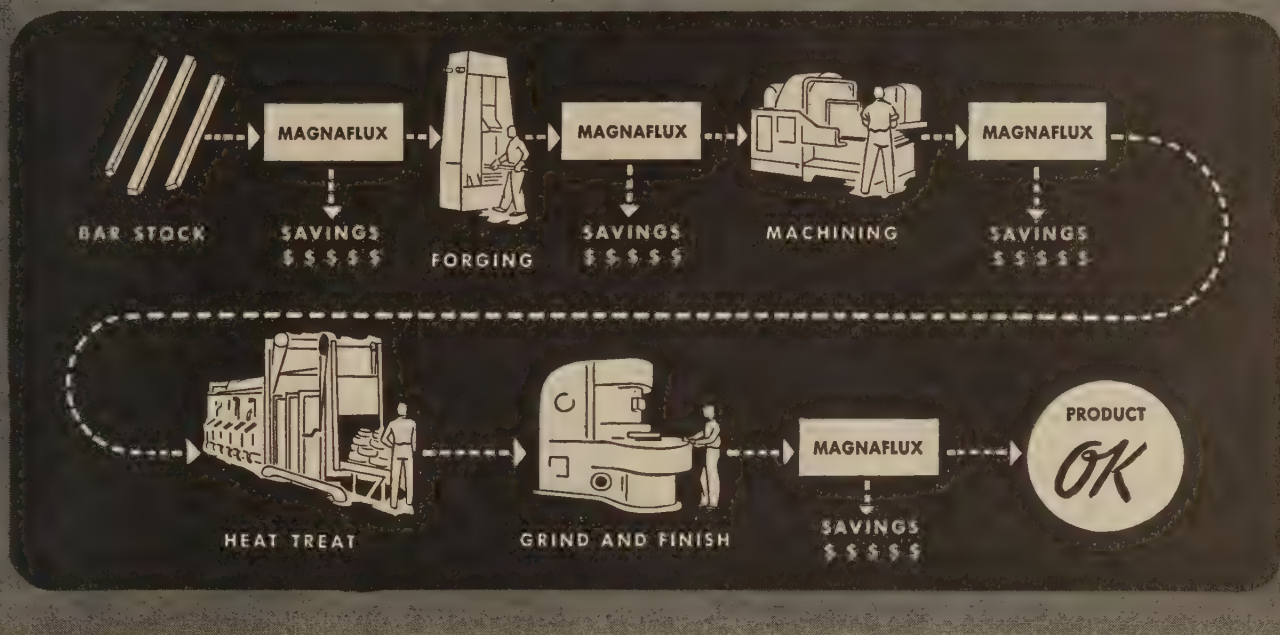
• **George Karol** has been appointed manager of the brokerage department of Iroquois Steel & Iron Co., Chicago.

• **Walter S. Marder** has been named sales manager of the Daystrom Corp., with his headquarters in New York. **Glenwood O. Evans** has been appointed to succeed Mr. Marder as comptroller, with his headquarters at Olean, N.Y. Mr. Evans was formerly general auditor for American Type Founders Inc.

• **William H. Uhl** has been promoted to chief development engineer of the USPM Div., Commercial Controls Corp., Rochester. Mr. Uhl joined the firm six year ago and formerly served as special assistant to the general works manager.

• **John J. Lincoln, Jr.** has been appointed manager of the railroad department, Air Reduction Sales Co., New York. Mr. Lincoln joined

How MAGNAFLUX* Production Line Inspection CAN CUT YOUR MANUFACTURING COSTS



Defective parts are rejected *before* additional money is spent in finishing them with inspection by Magnaflux on the production line and trouble is found and corrected when it occurs—not later. For many plants this method of inspection is already saving thousands of dollars in manufacturing costs each year.

For example, by inspection with Magnaflux a gear manufacturer is able to reject defective pieces of material in bar form, or after forging. He saves the cost of machining,

heat treating, grinding and finishing many pieces which would later be rejected at final inspection. In rejecting still more pieces after machining, with a third Magnaflux inspection, he saves the cost of heat treating and grinding.

Add up the total savings made by cutting out subsequent steps for all rejects. You'll see that *total* cost of inspection is *much less* than cost of carrying all defective parts to finish stage. Here, is a table showing these savings:

Table Based on Processing 1000 Parts	Processing Cost Investment	Rejects Due to Operation	Savings in Cost to Finish	Inspection Costs all Parts
Bar	\$ 1.00	10	\$190.00	\$ 70.00
Forging	3.00	10	170.00	69.30
Machined Gear	11.00	10	90.00	68.60
Ground and Finished Gear	20.00	20		67.20
		50	\$450.00	\$275.10

Inspection with Magnaflux not only pays for itself, but gives a net savings of \$174.90 per 1,000 gears. This example is based on 100% inspection after each operation except heat treating. However, sampling methods often can be used for similar in-process inspection to cut manufacturing costs.

Magnaflux, and other Magnaflux Corporation non-destructive testing methods, make cracks and other defects readily visible for inspection of every part at production line speed. Write today for full information on how Magnaflux can help you raise product quality and cut production costs.

*Magnaflux, Reg. U. S. Pat. Off., a trade mark of Magnaflux Corporation applied to its equipment and materials for magnetic particle inspection.



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CLEVELAND

Air Reduction in 1924. After sales work in several districts, he became successively manager in Pittsburgh and regional sales manager in New York. In 1945 he was appointed director of sales services.

• **William B. Kempton** has been appointed assistant manager of the hardware products department of Wickwire Spencer Div., Colorado Fuel & Iron Corp., Buffalo. Mr. Kempton has been a member of the Boston district office for many years.

• **A. W. Wood** and **L. B. Rahn** have been appointed field engineers for the Elliott Co., Jeannette, Pa. Mr. Wood will serve in the Detroit district office and Mr. Rahn in the New York district office. **F. C. Hohenstein**, engineer, has been assigned to the Chicago office; **M. C. Seeman**, engineer, to the Cleveland office; **G. J. Greaney, Jr.**, engineer, to the Houston office; **J. U. Kauffman**, engineer, to the St. Louis office, **R. L. Henry**, engineer, to the Tulsa office and **W. W. Gotherman** to the Washington, D. C., office.

• **A. L. Hawk** has been named assistant to the western district manager in Chicago, and **R. B. Hazard** has been appointed to succeed Mr. Hawk as manager of distributor sales, western district, Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N.J. Both men have been associated with the company for many years. Mr. Hazard formerly represented the Asbestos Textile & Packing Div. in the Minneapolis territory.

OBITUARIES

• **Frederick H. Loomis**, assistant general manager of sales, Republic Steel Corp., Cleveland, died July 1.

• **William F. Tynes**, 52, president of Hardie-Tynes Mfg. Co., Birmingham, died July 1.

• **William F. Hart**, 65, of the National Supply Co., Pittsburgh, died July 1.

• **D. C. Oviatt**, president, D. C. Oviatt & Co., Cleveland, died June 20.

• **Edward J. O'Connor**, 39, safety manager, Harrison Radiator Div., General Motors Corp., Buffalo, died June 28.

• **A. J. Browning**, vice-president and director of purchasing, Ford Motor Co., Dearborn, Mich., died July 2.



Alarm clock, electric razor, telephone, automobile, typewriter, calculator, switches and electric motors, pruning shears, push button radio controls and . . . yes, the juke box—the list goes on and on . . . all function because of dependable wire springs—JOHNSON XLO Music Spring Wire, the wire of a thousand uses, made under strict laboratory control all the way from mine to you.

JOHNSON

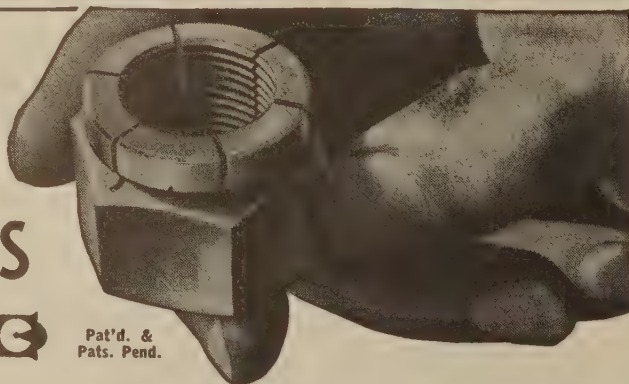
STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.

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SAMPLES



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Pats. Pend.



SELF-LOCKING NUTS

The one-piece, all-metal "Flexloc" packs maximum usefulness in minimum space by combining, as it does, a stop, a lock and a plain nut all in one.

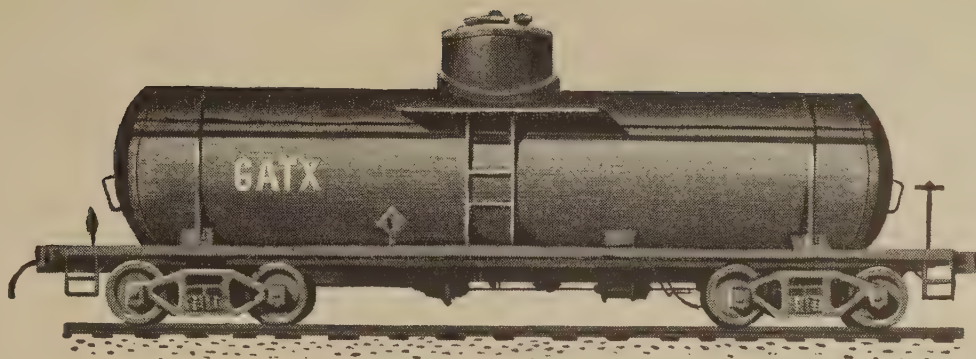
Every thread—including the locking threads—takes its share of the load. "Flexloc" accommodates itself to a wide range of thread tolerances . . . can be used over and over again without losing much of its locking torque . . . is not affected by temperatures likely to be met within the field of Mechanical Engineering . . . and being a "stop" nut, it stays locked in any position on the threaded member. The "Flexloc" is processed to have an exceptionally uniform torque. The *Thin* "Flexloc" has become very popular because its *tensile* is so high and the space it occupies so small.

Sizes from #6 to 2" in diameter—in "regular" and "thin" types—in NC and NF thread series. Write for "Flexloc" Catalog.

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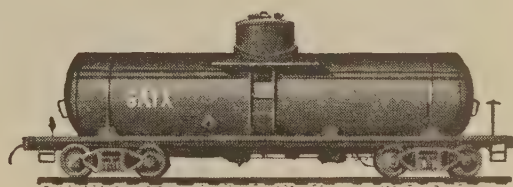
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**is filling the
gaps in the tank car
supply as rapidly
as possible**



The GATX fleet of more than 38,000 tank cars is growing . . . growing as fast as the still-limited supply of materials permits. When we can get additional materials for building more tank cars, we will use our expanded facilities to furnish *all* our customers with *all* the tank cars they need.



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EXPORT DEPT., 10 East 49th Street, New York 17, New York

Revised FHA Standards Accept Aluminum Forms For Plumbing Systems

Louisville, Ky.

• • • Aluminum pipe and tubing is acceptable now for use as vent pipes in plumbing systems according to revised standards issued by the underwriting division of the Federal Housing Administration.

The standards specify that aluminum may be used for dry vents where the lowest connection to the ferrous metal piping is not less than 6 inches above the flood rim of any plumbing on which the vent is installed. Proper cathodic protection for the aluminum pipe or fitting is required at each joint with ferrous metals.

Fittings within the aluminum vent system should be either cast, wrought or forged aluminum. The forged or wrought fittings may be specified as 2S, 3S, A51S, 53S, R353, 61S, R361, or 63S. Where cast fittings are used, they may be specified either as 43, B214, or 356 alloy. Where aluminum fittings are not available, galvanized iron or steel

fittings may be used. Where not galvanized, the iron or steel fittings must be provided with acceptable cathodic protection.

A suitable cathodic protection may be secured by inserting a zinc sleeve or washer into the fittings ahead of the aluminum pipe. This zinc washer or sleeve may be of the same inside diameter as the pipe used in the system and of a slightly smaller outside diameter to permit easy insertion into the fitting.

The FHA standards recommend that a thread lubricant be used in threaded joints involving aluminum. Such lubricants as zinc dust in petrolatum, zinc stearate or any thread lubricant conforming to Army-Navy Aeronautical Specification AN-C-53; amendment 3, are designated as satisfactory.

Since its introduction into the building products field, aluminum has rapidly been adapted to a wide range of applications. The FHA has accepted it for use in roofing, flashing, termite shields, gutters, downspouts, siding, windows, and duct work. Aluminum nails have also been accepted for use with most types of building materials.

FHA bulletin UM-1 points out

that either aluminum tubing or standard IPS aluminum pipes may be used in either drawn or extruded forms. Alloys which are listed as acceptable include 2S, 3S, 61S, R361, and 63S.

Sheet aluminum flashing is recommended for use around the area where the vent penetrates the roof, although galvanized flashing may be used where aluminum is not available. Use of copper or lead flashing with aluminum vent pipes is not acceptable. Where brazing or welding is used in assembling sheet aluminum flashing, it is essential that all joints be thoroughly cleaned of flux on both sides before the vent is installed.

Contractor Not Relieved Of Responsibilities by Abnormal Price Rises

Washington

• • • A private bill which would have cancelled a Navy Dept. claim against the Winona Machine & Foundry Co. for non-performance of contract because of unforeseen cost has been killed by President Truman through a pocket veto.

White House action was based upon previous court rulings that an abnormal rise in the price of goods or transportation charges due to unusual trade conditions, even war, does not relieve a contractor of his responsibility.

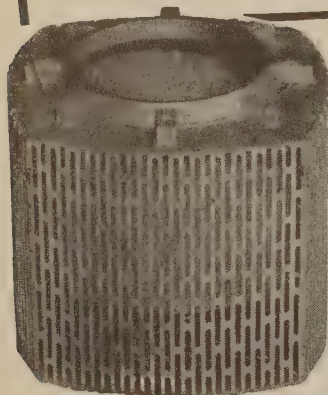
The foundry claim rose from a bid submitted in May 1940 to furnish stretcher weights for the Navy, the bid being accepted June 10 and a formal contract entered into on June 11.

In the meantime, the contractor found that scrap prices had increased and requested that the unit delivery price be changed accordingly. The request was turned down, the Navy holding that the contracting firm should have taken steps to protect its bid by purchasing its material when it submitted its bid.

Subsequently, the Navy decided delivery could not be made on time and purchased the weights elsewhere. Under article 5 of the contract, it charged the original bidder with the excess cost over the original bid—\$7,148.77.

The measure was disapproved as affording "preferential treatment to only one of many contractors for whom no similar relief is provided by law."

Perforated Strainers and —



HENDRICK is fully equipped to fabricate a wide range of products from perforated plate, that also involve shaping, forming, welding, riveting, brazing, etc. The pump strainer illustrated is a typical example.

For such operations Hendrick has an exceptionally large stock of dies and patterns, complete tool equipment, and ample forming and welding facilities.

Write for detailed information.



Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

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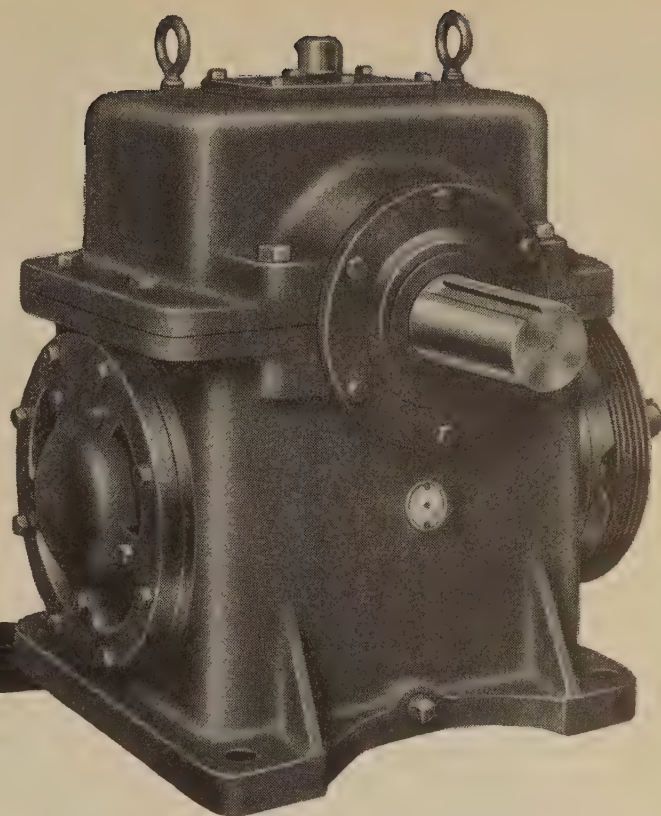
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FOOTE BROS. **NEW** **HYPower**

**enclosed worm
gear drives**

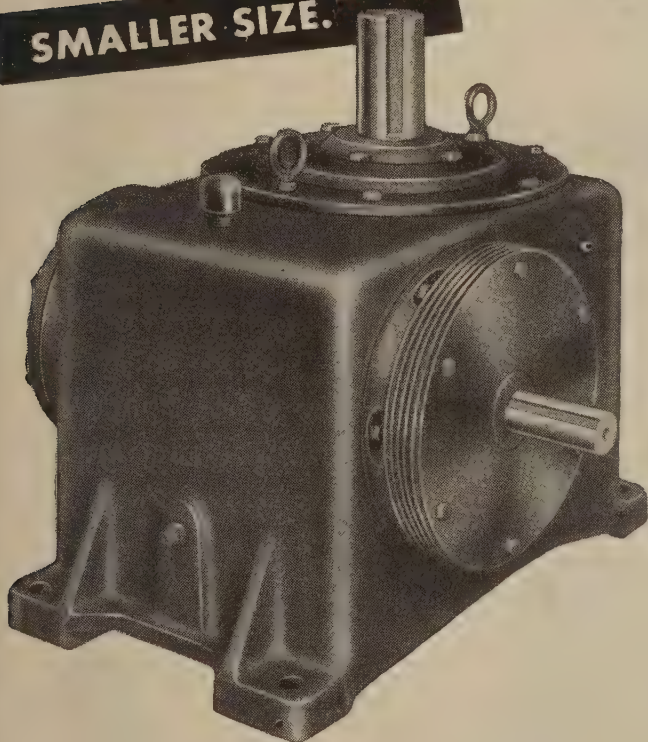


POWER AT LOWER COST...

LESS WEIGHT...

LOWER ORIGINAL COST...

SMALLER SIZE.



New! Foote Bros. Hypower enclosed worm gear drives. Revolutionary in design—superior in performance, they are more economical in original cost, and deliver horsepower at lower cost.

These units are smaller than conventional worm gear reducers and are lighter in weight. Their high capacity permits the use of a smaller reducer than would usually be required.

Among the many features that account for their amazing performance are:

- ... increased load-carrying capacity accomplished by a revolutionary new technique in generating gears.
- ... greatly increased thermal capacity. One of the features contributing to this increase is a high velocity air stream through an air channel cylinder having internal radiating fins immersed in the oil bath.
- ... elimination of oil leakage by use of a new type seal.
- ... a reduction in size and weight due to new design and improved methods of manufacture.
- ... increased mechanical capacity achieved through better metallurgical control of materials and improved manufacturing technique.

Foote Bros. Hypower units comply with the speed-ratio standards adopted by the American Gear Manufacturers Association (AGMA), and National Electrical Manufacturers Association (NEMA).

Mail coupon below for bulletin giving complete information on Foote Bros. Hypower enclosed worm gear drives.

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. O, 4545 S. Western Blvd., Chicago 9, Ill.

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Better Power Transmission Through Better Gears

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Chicago 9, Illinois

Please send me bulletin HPA on the new Foote Bros. Hypower Enclosed Worm Gear Drives.

Name.....

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City.....State.....

75 Years of Progress In Alloy Steel Will Be Theme for Exposition

Cleveland

• • • Celebration of the 75 years of progress made in alloy steel will be the central theme at the National Metal Congress and Exposition when the American Society for Metals holds its thirtieth annual convention in Philadelphia, Oct. 25 to 29.

The Metal Congress will feature a program of technical and historical papers about alloy steel; presentation of Distinguished Service Awards to individuals who have made outstanding contributions to the progress and development of alloy steels; and a dramatization of the part played by alloy steels in the history and development of our country.

Three committees, in each case composed of men who represent both the producing and consuming industries in alloy steel, have been chosen to work out the program of the celebration. One committee, consisting of presidents of steel

companies and manufacturing associations, the latter covering aircraft, automotive, electrical equipment, farm equipment, machine tools, petroleum, railroads and the Iron and Steel Institute, will serve with representatives of government, all large users of alloy steels, as the honorary committee.

The second committee will act on the awards to living individuals who can justifiably be honored for their contributions to the progress in the realm of alloy steels. This committee will consider nominations submitted to it and select the outstanding men in all branches of alloy steels.

The third committee's responsibility will be that of dramatizing the history and progress of alloy steel through a visual display of products, applications and services.

W. E. Eisenman, national secretary, American Society for Metals, pointed out that the society's 30 years of service to the metals industry have paralleled the period of greatest advances in alloy steel.

"The 20,000 members of AS," Mr. Eisenman said, "are representative of the producers and consumers of

alloy steel, and for that reason we are indeed pleased to assist in making this salute to alloy steels a deserved tribute to the many companies and their metallurgists who have made it a major factor in our national progress".

Installs Radiant Heating

Fort Wayne, Ind.

• • • Floor radiant heating has been installed in a new sand blasting building at the U. S. Rubber Co.'s Fort Wayne, Ind., plant to solve the problems resulting from the accumulation of fine sand on heating elements and piping.

C. A. Ostling, director of engineering for the company, explained that heating elements and exposed pipe became receptacles for sand and dust in such buildings and cause extra maintenance. Air heaters, he said, would agitate the air stream and constantly stir up the sand on the floor.

By embedding some 2000 ft of 1-in. wrought iron pipe coils in the concrete slab of the new 30 by 50-ft structure, the walls and ceiling remain free of mechanical equipment. This simplifies removal of the sand and dust generated in cleaning metal tanks by sand blasting before surfacing them with rubber.

Power Line Improved

Pittsburgh

• • • A 10,000-kva series capacitor has recently been installed on a 66-kv transmission line to a steel mill to improve regulation and reduce voltage flicker. The line serves four 10,000-kva electric arc furnaces and a heavy steel mill load. Westinghouse Electric Corp., which built the unit for Duquesne Light Co. here, says it is the largest series capacitor ever installed.

According to Westinghouse engineers, the new 500-amp unit has corrected occasional cases of unsatisfactory motor starting and running. This was caused by low voltage and voltage unbalance during heavy furnace-load periods. It was explained that a synchronous condenser to give the same voltage and flicker improvement would have had a higher kva rating than the capacitor. And it would have cost more to install, operate and maintain, the electrical manufacturing company engineers declared.

**MAN!—I know what they mean
by properly cooled drinking water"**

REFRIGERATION BY
Kelvinator

MADE BY
EBCO MANUFACTURING CO.
COLUMBUS, OHIO
U.S.A.

"It really perks you up . . . knocks out thirst
in a hurry . . . leaves you feeling better!"

You and your employees are both ahead
when there's plenty of *properly cooled* water
at convenient points. This healthful, satisfy-
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up human efficiency, reduces fatigue, and
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Electric Water Coolers where all employees
can quickly get all the fresh, cool water they
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FRANK CARLSON
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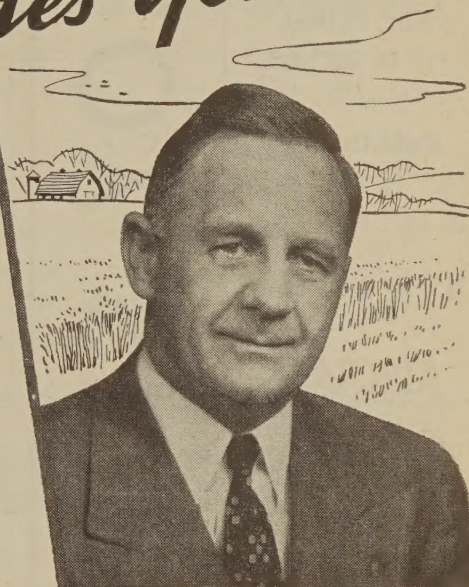
To American Industry:

Kansas has matchless and abundant resources which await only the magic touch of industry to spread their benefits to the world. Its rich soil produces the essential foodstuffs of life. Beneath the surface is stored in abundance cheap energy to turn the wheels of industry. The possibilities of rich reward are limitless.

The facilities of the State, including the active and aggressive Industrial Development Commission, are pledged to offer every encouragement and assistance in working out the problems of new industries seeking to process and distribute the great natural resources of Kansas, which furnish fertile and almost virgin soil for aggressive modern development. A thorough investigation is always welcomed. Modern transportation permits products of Kansas industry to radiate cheaply to all parts of the country.

Sincerely,

Frank Carlson
Governor



Frank Carlson

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

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NEWS OF INDUSTRY

ECA Authorizes Metal And Minerals Exports Totaling \$2.8 Million

Washington

• • • Additional authorizations for the purchase of \$2.8 million worth of American metals and minerals through the Economic Cooperation Administration have been approved by ECA Administrator Paul G. Hoffman.

Latest authorizations included \$2.2 million worth of electrolytic copper of which \$2 million was earmarked for France and North Africa and the remainder for Austria. Austria was also authorized to buy \$210,000 worth of ferrochrome and ferromanganese. France was allocated \$140,000 worth of cadmium and \$275,000 worth of molybdenum.

At the same time, Austria was given authorization to purchase \$348,000 worth of brass sheets, mostly from Canada, as well as \$42,000 worth of Canadian nickel.

Seek Pipeline Approval

Washington

• • • San Juan Pipe Line Co. has applied to the Federal Power Commission for permission to construct a pipeline connecting the San Juan basin of New Mexico with Mojave County, Ariz., to a point near Needles, Calif.

The proposed line would install 26-in. pipe for the entire distance; the total construction cost would approximate \$28 million. More than 100 miles of feeder and gathering lines would be installed.

Temporary approval has been granted the Ohio Fuel Gas Co. to construct 61 miles of 20-in. transmission line from Richland county to Toledo. It would replace smaller pipe.

Booklet Describes Dravo

Pittsburgh

• • • A booklet tracing the history of Dravo Corp. in various industrial fields since its establishment in 1891, has just been published here by that firm.

Featured is the part the corporation and its affiliates played in the development of river navigation during the last half century.

While the contracting division, and its predecessor, Dravo Contracting Co., built navigation locks

Also, France was allocated \$3.4 million worth of copper to be bought from Chile and \$240,000 worth of zinc ore from Peru. United Kingdom would get \$2.7 million worth of Chilean electrolytic copper.

Total authorizations during the first three months of the program amounted to \$762 million, including Trieste and China, Hoffman reports. Of this amount, about \$197 million or about 25 pct was to be purchased by government agencies—Bureau of Federal Supply and the Depts. of Agriculture, Army and Navy. The remainder would be acquired through trade channels.

Of the first quarter (April-June) authorizations, Hoffman's report showed, the total for purchases of metals and equipment amounted to more than \$71 million. By major categories, these were: iron and steel, \$11.9 million; nonferrous metals, \$49.9 million; and, agriculture and industrial equipment, \$9.9 million.

and dams, bridges, piers, ice-breakers, flood control dams and coal and ore docks, the engineering works division designed and manufactured towboats, barges and other marine equipment. Growth of power plant, heating and air conditioning activities is also described.

Grants 8 Pct Wage Raise

Milwaukee

• • • Allis-Chalmers Mfg. Co. has announced an 8 pct wage increase representing 9¢ to 15¢ an hr for some 33,000 employees in nine plants, effective June 21. It covers all hourly, and salaried employees not covered by collective bargaining agreements, receiving under \$6000 annually, and will total about \$8,500,000 a yr. No hourly worker, under the offer, receives an increase of less than 9¢, while salaried employees receive a boost of not less than \$16 per month.

Mill Makes First Shipment

Gadsden, Ala.

• • • Republic Steel Corp.'s new tube mill here has made its first shipment and full capacity operations are expected to be reached by the first of the year.

First shipment from the mill, which will produce 20 to 30-in. pipe in lengths up to 30 ft, went to Southern Natural Gas Co., Birmingham.

Government Allocation Of Chemicals Is Not Solution to Shortages

Washington

• • • Shortages of chromic acid and sodium bichromate are due primarily to domestic maldistribution and cannot properly be eliminated by government allocation or reduced export quotas, the Commerce Dept. has decided.

The department's Office of International Trade notes that current shortages of these two commodities are in the metal finishing industry. Normally, this industry accounts for about 85 pct of domestic consumption.

Officials of OIT and the affected industry decided after an industry advisory meeting that current export quotas for chrome chemicals "are not unduly high, and do not seriously affect the domestic consumer."

OIT said that over-ordering by many firms, for resale at high prices, was a primary cause of the tight supply situation. The agency pointed out that both industry and government members of the advisory committee are unanimous in feeling that government allocation would not provide a desirable solution to the distribution problem. Better distribution practices, OIT stated, must come from the trade itself.

Building Cost Index Up

Cleveland

• • • Cumulative impact of basing point decisions, draft legislation and advancing wage and freight rates has set the stage for a further continuation of the upward trend in industrial building costs, according to George A. Bryant, president, the Austin Co. He reported a second quarter advance of two points in the Austin Co. building cost index (1926 = 100), which now stands at 170.

Publish Molybdenum Book

New York

• • • Climax Molybdenum Co., New York, has announced publication of a new book entitled "Molybdenum: Steels, Iron, Alloys." The text describes the varied applications of molybdenum as an alloying element in a wide range of materials from wrought to cast steels and from cast iron to nonferrous alloys.

McDANEL High Temperature COMBUSTION TUBES

High Temperature
Combustion Tubes.

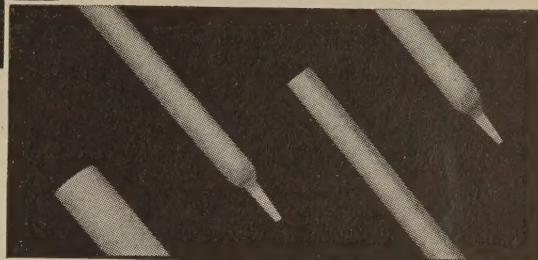
Self-cooling Com-
bustion Tubes.

Refractory Porce-
lain Specialties in
stock or designed to
meet specific needs.

Specify

McDanel High Temperature
Combustion Tubes
from your supplier.

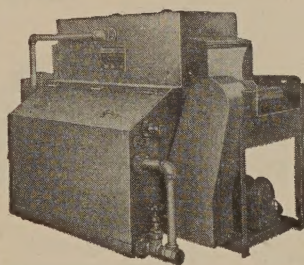
*For Carbon
and Sulphur
Determinations*



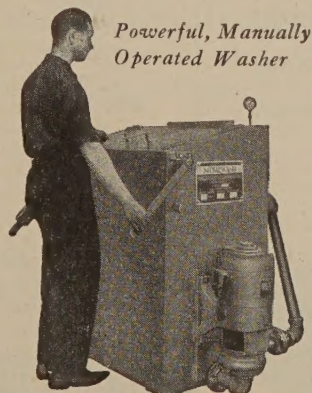
- McDanel Combustion Tubes are non-porous, gas tight and highly refractory.
- McDanel Combustion Tubes defy devitrification.
- McDanel Combustion Tubes are precision made of high temperature porcelain—straight and tapered end—outstanding in quality and in performance.

McDanel Refractory Porcelain Co.
Beaver Falls . . . Penna.

LITTLE WASHERS DO BIG JOBS



Small Automatic
Conveyorized Parts Washer



Powerful, Manually
Operated Washer

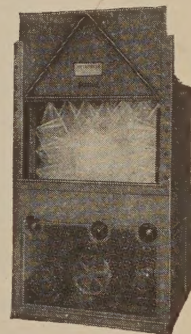
CONVEYORIZED, CABINET
TYPE and MANUALLY OP-
ERATED METAL PARTS
WASHERS IDEAL FOR
SMALL SHOPS OR DE-
PARTMENTAL USE

Here is a variety of small METALWASH Spray Type Washers especially designed for shops and departments where a large variety of metal parts must be cleaned in small volume lots.

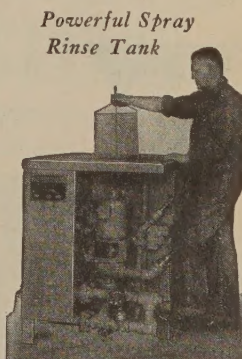
All of these machines are equipped with powerful pumps and high pressure sprays which quickly strip off all dirt, oil, grease or plating solutions. Each is a compact complete unit, easy to use, economical to operate.

We design and manufacture a complete line of all types of metal cleaning, pickling and drying equipment. Write today for further information.

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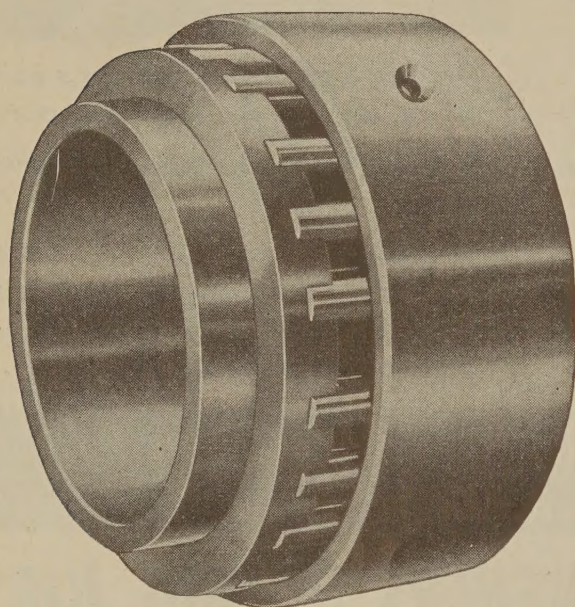
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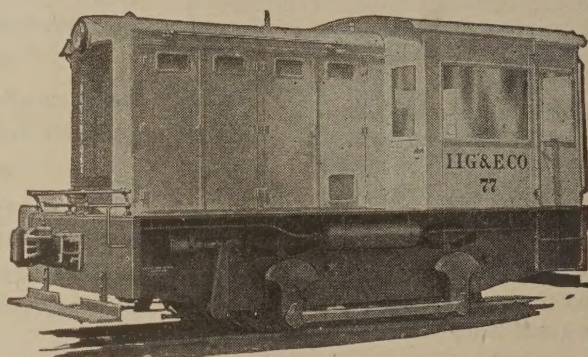
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